POPULAR SCIENCE

Feb. 1948 · 25c

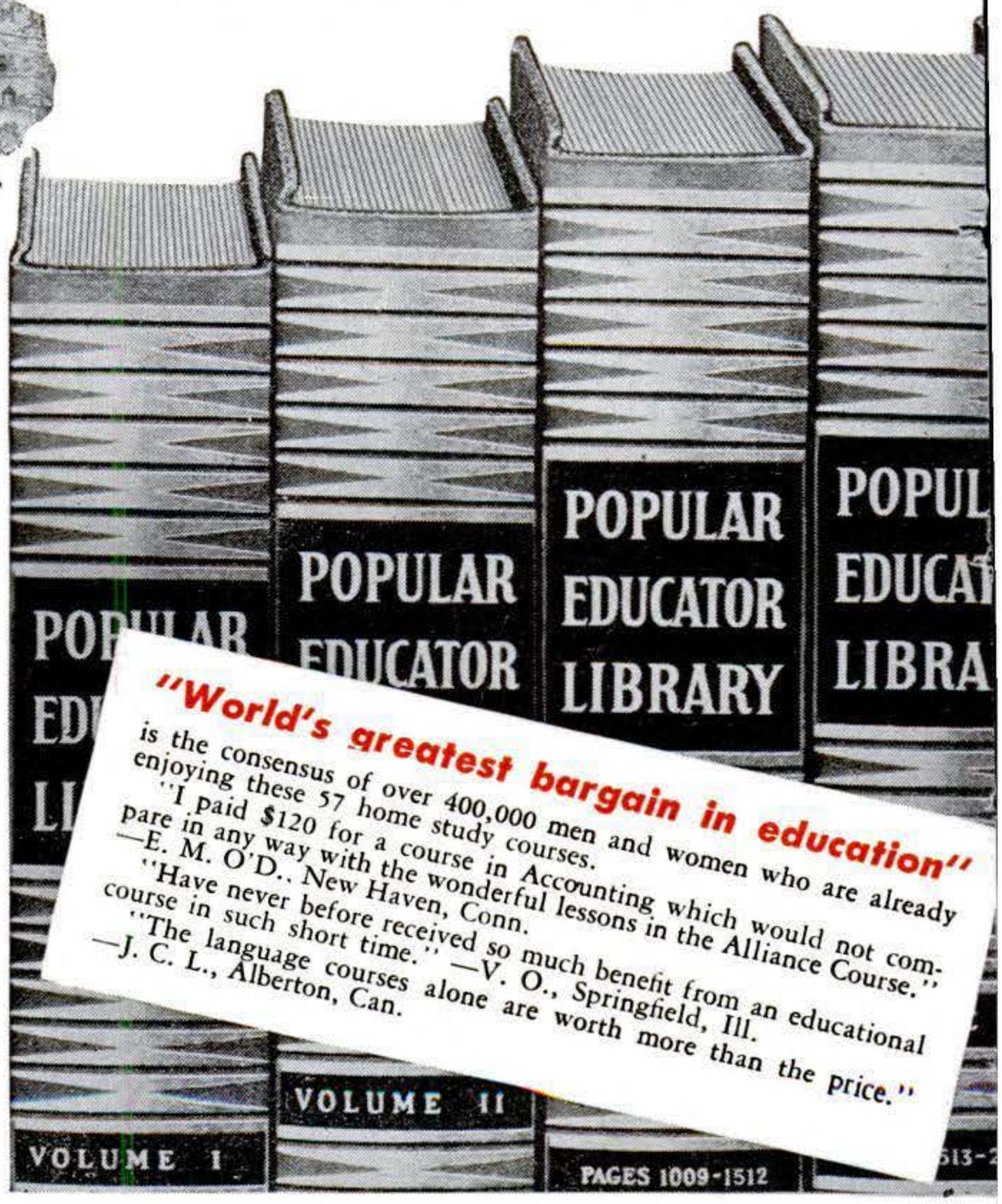
New Guns for Human Bullets

PAGE 98

The Higher Educatio

now yours at the Miracle Rat

IMAGINE! Eminent educators especially chosen from 47 universities such as ***Harvard, Pittsburgh, M.I.T., Oregon, Notre D Princeton,*** and dozens of others, bringing enjoyable instruction t in your own home, for about 1 cent a lesson! Think what this r today—to have the advantages of a higher education when Amer swinging into the greatest boom of all time! Think how you can in—through a bigger job—bigger business—bigger earnings by e ing this golden era with the equipment of a college-trained man! the N. E. A. brings you this training at a price that's truly a mir



Handsome, Life-Time Binding of Seal Grained Novelex Beautifully Embossed Hand-Tooled in colors of Maroon and Gold. This Standard Edition is illustra here. Also a DE LUXE EDITION in Genuine Morocco-Grained Artcraft—the word in beauty and distinction—for only 50c extra per volume. For Free Tria De Luxe Edition, check box in coupon on opposite page.

To Help Millions Increase Their Earnings through Greater Knowledge, the Alliance now Offers its 57 Famous EASY-READING Courses at Amazingly LOW Cost!

HIGHER education and higher earnings go hand in hand! To aid men and women in develop- ng all their possibilities for personal advancement he National Educational Alliance has now put all f its famous 57 courses into book form—THE POPULAR EDUCATOR LIBRARY. These 57 Reading Courses—prepared by educators from such amed universities as **Yale, Stamford, Northwestern, Stevens, Cornell,** and many more—cover a great ange of subjects. They provide a broad training hat has lifted leaders in EVERY field to success.

An education of this scope would ordinarily cost you housands of dollars and years devoted to school and ollege. Yet through THE POPULAR EDUCATOR LIBRARY you can educate yourself quickly in your pare time at home—at a cost of only a few cents per ubject! Note that in each course the instructor-editor s an eminent educator carefully chosen for his specialty rom one of America's great universities—every one an uthority of the highest standing!

Just As In College You Study Only the Courses You Want

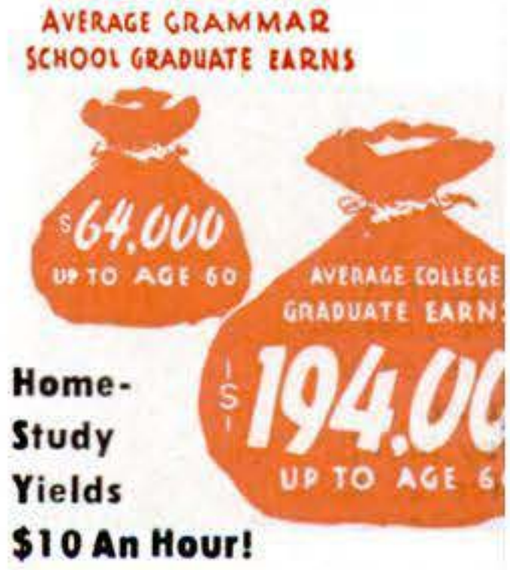
Think of Studying Courses of Immediate Practical Value . . .
ACCOUNTANCY, PSYCHOLOGY, CHEMISTRY, MATHEMATICS, ENGLISH, etc., for only a few cents each!

NO longer need you believe the old saying that "there is no royal road to knowl- edge," for the ALLIANCE has surveyed and paved the path for you—and has made a higher education, PRACTICAL KNOWLEDGE FOR ALL, available at a cost that s probably less than you now spend for your daily newspapers.

Take, for example, a subject like PSYCHOLOGY. If you had to attend lectures n this subject in person at a college, it would cost you hundreds of dollars—and ven an elementary textbook would cost you hree or four dollars. Yet the NATIONAL EDUCATIONAL ALLIANCE brings you a complete and practical survey of this useful science in 38 individual lessons by an eminent educator especially selected from Northwestern University—AT A TOTAL COST OF LESS THAN 35 CENTS!

Learning Made as Enjoyable as Reading!

These 57 Courses are as enjoyable as reading a popular picture magazine. They are so varied in appeal, so absorbing in interest that you will devour the lessons without realizing that you are "studying." Every Course is carefully graded and easy to follow. Every illustrated lesson is short enough to be absorbed in a few minutes. Your mind retains what you learn without effort—and opens to new horizons, new achievement, and greater earning possibilities than you have ever envisioned.



Home-Study Yields $10 An Hour!

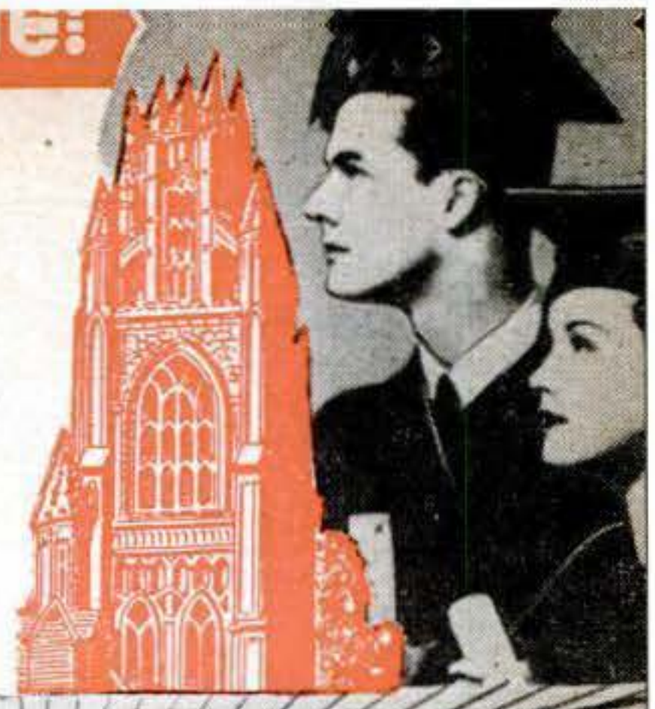
According to a famous survey, ings of college graduates up t of 60 averaged more than $10 greater than the earnings of mar school and high school ates. Any person who absorb information in the N. E. A. C possesses a practical educa background comparable to that average university graduate.

ACT NOW—Bring this "University Education" to Your Home—Mail Thi

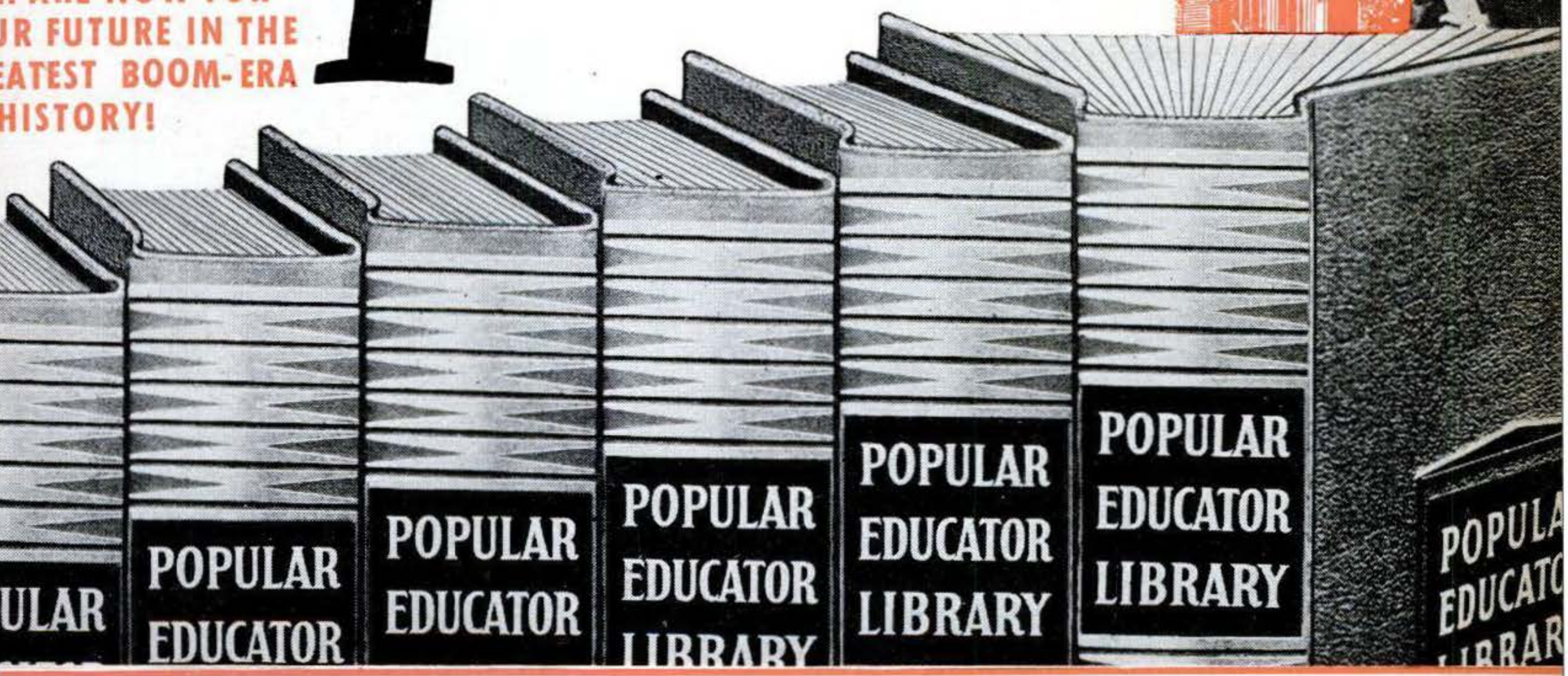
ng a University Education into Your Home!

You Need for Success

f about 1¢ a Lesson!



EPARE NOW FOR
UR FUTURE IN THE
EATEST BOOM-ERA
HISTORY!



The Popular Educator Library—10 Magnificent Volumes

57 Complete Courses—1585 Illustrated Lessons!

Prepared by 61 Eminent Educators Selected From 47 Great Universities! 5120 Pages! 2437 Pictures!

ntancy. E. A. Saliers, M. A., Ph. D., **Lou- a State Univ.**

autics. Theodor Von an, M. E., Ph. D.; J. Malina, **California Technology.**

and Architecture. t Pickering, B. Sc., rch., **University of nnati.**

nomy. Clyde Fisher, , L.L. D., **Amer. Mus. at. History.**

ry. John H. Gerould, , **Dartmouth College.**

ess English. John y Fife, B. A., M. A., **ens Inst. of Technology.**

Chemistry. L. A. Goldblatt, Ph. D., **University of Pittsburgh.**

Drawing and Design. Andrew McD. Vincent. **University of Oregon.**

Economics. Frank T. Stockton, A. B., L. H. D., Ph. D., **Univ. of Kansas.**

Engineering. Fred Asa Barnes, C. E., M. C. E., F. A. A. A. S., **Cornell University.**

English Literature. Hoyt H. Hudson, Ph. D., **Princeton Univ.**

French. Earl F. Langwell, Ph. D., **University of Notre Dame.**

Geology. Terrence T. Quirke, M. Sc., Ph. D., F. A. A. S., **Univ. of Illinois.**

History. Ancient, European and Modern. Walter Hyde, **Univ. of Pennsylvania,** and Tibor Kerekes, **Georgetown Univ.**

Journalism. Grant M. Hyde, B. A., M. A., **University of Wisconsin.**

Latin. Roy J. Deferrari, A. B., M. A., Ph. D., **Catholic University of America.**

Law. E. Karl McGinnis, A. B., J. D., **University of Texas.**

Mathematics. William Whitefield Elliott, A. B., Ph. D., **Duke University.**

Philosophy. Harry A. Overstreet, A. B., B. Sc., **City College of New York.**

Photography. S. G. B. Stubbs, General Editor, **Waverley Technical Encyclopedia.**

Physics. L. L. Hendren, M. A., Ph. D., **University of Georgia.**

Physiology and Anatomy. Harold E. Himwich, B. S., M. D., **Union University.**

Psychology. Adam R. Gilliland, B. O., B. A., Ph. D., **Northwestern University.**

Radio and Television. Richard D. Fay, A. B., S. B., **Mass. Inst. of Technology.**

Spanish. Francis M. Kercheville, B. A., M. A., Ph. D., **University of New Mexico.**

Also complete courses in American History, Anthropology, Archaeology, Bible History, Botany, Civics, Classical Literature, Drama, Economic Geography, English Language, English History, Eurythmics, Geography, German, Greek, Interior Decorating, Italian, Mnemonics, Money, Music, Penmanship, Philology, Phonetics, Physical Geography, Politics, Shorthand (Gregg & Pitman), Social History, Typewriting, Writing, Zoology.

Examine FREE All 57 Courses this Great 10-Volume Library

r 5 days' FREE examination of these 57 courses, superb volumes, in your own home. If not nted, return them and your examination will not cost you one cent. But if you are convinced that courses are indeed the world's greatest educa- l value—then keep the Library, and remit, in monthly installments, the incredibly low bargain at the rate of about 1 cent a lesson! Only a ed number of sets available.

e paper shortage prevents reprint. Avoid ppointment. Mail Free-Trial Coupon NOW!

TIONAL EDUCATIONAL ALLIANCE, Inc.
7 West 47th Street, New York 19, New York

REE-Trial Coupon! →

NATIONAL EDUCATIONAL ALLIANCE, Inc.
37 West 47th Street, New York 19, N. Y.

Please reserve for me, for free examination, a set of the 10-volume POPULAR EDUCATOR LIBRARY, bound in beautifully grained Novelex library cloth—57 courses of 1585 lectures, 5120 pages, 2437 pictures.

Notify me when the books are ready to ship and I will send only $1.00 deposit. On receipt of it, ship me the books prepaid for 5 days' free reading. At the end of that time, I will either return the set and you will refund my $1.00; or I will keep the set, count the $1.00 deposit as first payment and send you only $2.00 each month until the bargain price of only $19.80, plus a few cents postage, has been paid.

SHIPPING WEIGHT 20 LBS.

If $1.00 deposit accompanies this reservation, Library will be shipped postage free. Same return and refund privilege.

DO NOT WRITE IN BOXES

87

802

Name.....

Address.....

City & Zone No.....State.....

☐ Check here if you prefer beautiful De Luxe Edition in richly embossed genuine Morocco-Grained Artcraft for only 50c extra per volume. Same terms.

FOUNDED 1872

POPULAR SCIENCE

MECHANICS AND HANDICRAFT REG. U.S. PAT. OFF.

VOL. 152: NO. 2

EDITOR: Perry Githens

MANAGING EDITORS: Fred O. Newman, Volta Torrey. **ART EDITOR:** Howard C. Jensen.

MECHANICS & HANDICRAFT EDITORS: Harry Walton, Frank Rowsome, Jr.

ASSOCIATE EDITORS: Alden P. Armagnac, Devon Francis, Robert Gorman. Sheldon Gallager, Hartley E. Howe, Herbert Johansen, Martin Mann, John F. Stearns, R. P. Stevenson.

ART DIRECTOR: Harry Samuels. ART ASSOCIATES: Herbert Anthony, Eric Karminski, Jr., Saverio Rada, Frances Cooper (Production).

STAFF PHOTOGRAPHERS: W. W. Morris (Chief), Hubert Luckett.

WESTERN EDITOR: Andrew R. Boone (Los Angeles).

EDITORIAL ASSISTANTS: Mae G. Dyer (Assistant to the Editor), Julia Charnif, Carol Ennis, Charlotte Korch, Agnes T. Quille, Ruth Westphal.

PUBLISHER: Godfrey Hammond

CONTENTS FOR FEBRUARY, 1948

Cover painting by Lester Fagans

Science News

New Guns for Human Bullets..... 98
How to Run an Atomic Power Plant.....128
Silent Sounds Are Hot.....135
Air's Gas Turbine Goes to Sea.....153
For Germ-Killing Lamps.....156
Freeze Treatment Hardens Soft Metal....164

Science at Work

Picture of the Month..... 97
Big Glass Has a Rival.....102
New Buick Flows from Low to High.....113
Sand Sinks Oil Slick.....119
Cooling Off the Cast.....121
New Calculating Wizard.....134
Trains Get a Brake.....139
10,000 Volts for a Dollar.....144
Rocket Tests Televised.....156
Better Beet Harvester.....158

PS Features

Desert Scenes in Miniature.....108
Multi-Lift Hoist Dumps Faster.....110
Wrist Watch that Rings.....120
Nipples Slip On Easily.....121
Shaking Out the Coal.....124
Gates Grasp Boxcargo.....134
Putting a Glow into Plastics.....143
Juke Box Gets New Look.....157
Don't Try to Crash This Gate!.....160
How a Cash Register Works.....166
Steam that's Hot as Fire.....228

Aviation

Hercules Hogs Harbor.....111
Helicopter Flies "No Hands".....125
What's New in Aviation.....140
Flying Freight Train.....142
Helicopters Fight Erosion.....165

Automobiles

How Cars Are Washed in Laundries.....122
New Hudson Hugs the Road.....126
Junior Station Wagon.....139
Will Hot-Air Engine Drive New Cars?....145
New Luxury En Route.....150
Autos Ride Piggy-Back.....158
Giant Trailers Plow Through Desert.....159
An Expert Tackles a Valve Job.....168
Gus Wilson and the Deepee.....172
Hints from the Model Garage.....176
Builds Own Station Wagon.....178
Blocks Raise Car for Mechanic.....227
Trailer Built from Glider.....236

Inventions

New Machines, Methods Rebuild Britain..104
New Ideas from the Inventors.....106
I'd Like to See Them Make.....112

Ⓣ *This mark in text indicates Trade Name.*

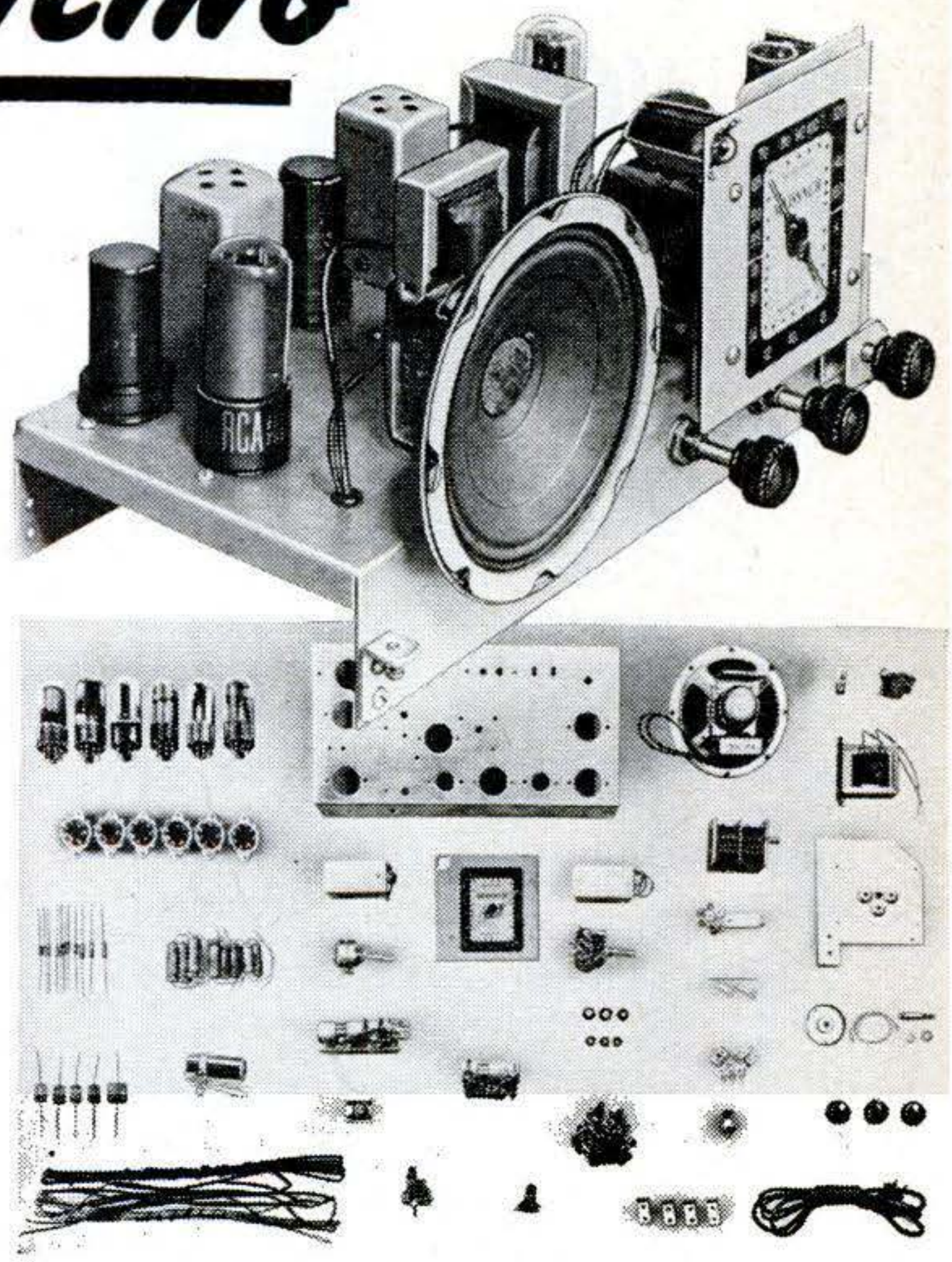
Continued on page 4

Published monthly at 353 Fourth Avenue, New York 10, N. Y., by Popular Science Publishing Co., Inc. Godfrey Hammond, President and Treasurer; R. C. Wilson, Raymond J. Brown, Stephen P. Glennon, Vice-Presidents; F. W. Briggs, Secretary. Entered as second-class matter Dec. 28, 1918, at the Post Office at New York under the act of March 3, 1879; additional entry as second-class matter at Dayton, Ohio. Entered as second-class matter at the Post Office Department, Canada. Printed in U. S. A. Copyright, 1948, by Popular Science Publishing Co., Inc. All rights reserved in the United States, Great Britain, and in all countries participating in the International Copyright Convention and Pan-American Copyright Convention. Yearly subscriptions to United States, its possessions and Canada, $2.50; foreign countries, $3.50. Subscribers must notify us of change of address four weeks in advance of the next publication date. Be sure to give both old and new addresses, including zone numbers.

It's complete! It's practical! It's up-to-date!

the new I.C.S. COURSE in RADIO SERVICING

Build this 6-tube, two-band, AC/DC, superheterodyne receiver. Put it through various tests and analyses used in modern radio service shops. Learn by study! Learn by doing!



HERE IT IS! A Radio Servicing course that is complete, thorough, extremely practical. This is the training for the man who wants a good job in radio – or a profitable radio service business of his own.

It's new! It's up-to-the-minute! Texts and job sheets cover all the equipment you are likely to meet in practice, including facsimile, television and FM.

You get this set of professional-quality tools early in the course. Illustrated instruction sheets show you how to use them correctly.

A complete kit of high-quality, standard-brand, matched radio parts is supplied with the course. Assignments cover assembly, wiring, soldering and testing.

Success-proved I. C. S. training methods – combined with the finest training equipment available – make this course an outstanding training opportunity. Find out more about it. Mail the coupon TODAY.

ICS

INTERNATIONAL CORRESPONDENCE SCHOOLS, Box 7601-M, Scranton 9, Pa.

Without cost or obligation please send me full information on the courses before which I have marked X.

RADIO SERVICING ***(with training equipment)***

- ☐ Radio, General
- ☐ Radio, Operating
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Telegraph Engineering
- ☐ Electrical Engineering
- ☐ Lighting Technician
- ☐ Practical Electrician
- ☐ Business Administration
- ☐ Salesmanship

Name _____

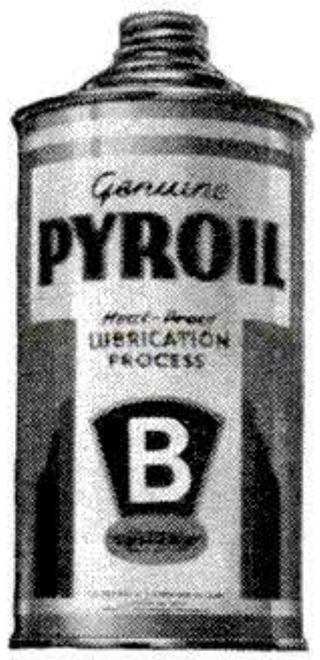
Address _____

City _____ *State* _____

Age ____ *Occupation* _____ *Working Hours* ____ *A.M. to* ____ *P.M.*

Copyrighted material

the "PYROIL Habit" is good for your car . . .



Millions of car owners have developed the constructive habit of saying "add Pyroil" to their gas station attendants. And when they add Pyroil, they add mileage to their cars. Pyroil gives oil the property of adhering to metal surfaces—it prevents "battery drain" slow starts—it prevents excessive dry start wear and corrosion.

Introduce your car to the comfort of Pyroil. Ask your gas station attendant.

Pyroil for Aircraft Engines
Use Aircraft Pyroil B for lubricating oil, Aircraft Pyroil A for gasoline.

Manufactured and Guaranteed by Pyroil Company, 291 Main Street, La Crosse, Wisconsin

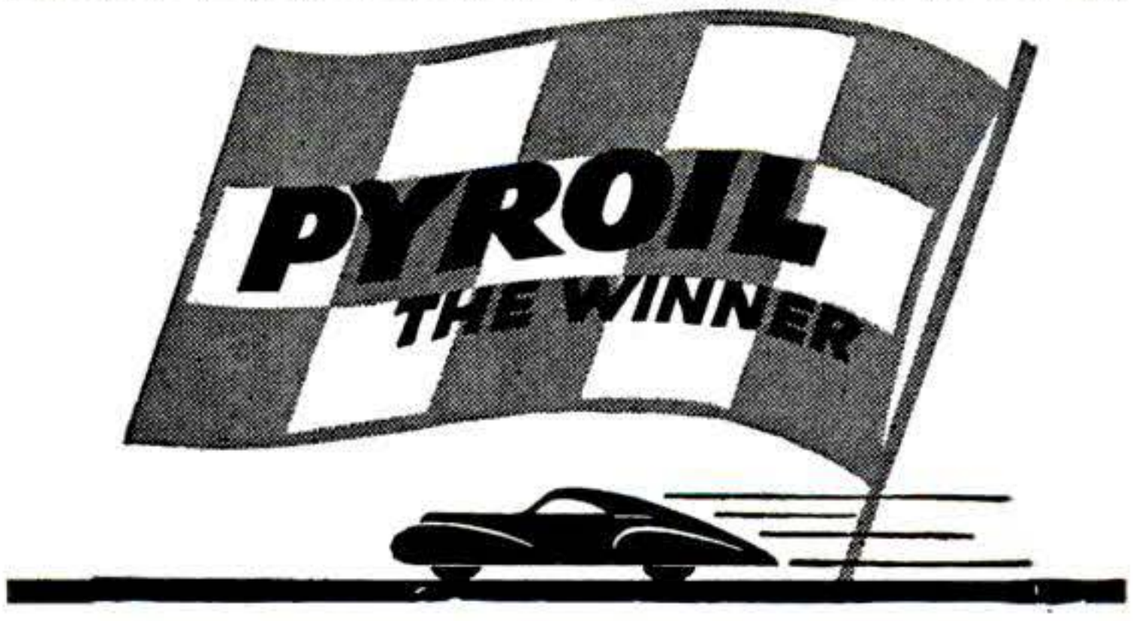
Canadian Distributors: Central Purchasing Agencies, Ltd., Toronto, Ontario, Canada

PYROIL COMPANY
291 Main Street, La Crosse, Wisconsin
I want my car to last and run properly. Please tell me more about Pyroil and how it can accomplish this for me.

Name.....

Address.....

City or Town.....State.....



Photography

Making Radar Recollect.....155
Carriers Cut from Folders.....212
One Turn Locks Pan-Tilt Head.....214
Timer Mounted on Enlarger.....216

Mechanics & Shopcraft

Grinder Jig Duplicates Threads.....187
Jig Trims Off Edges on Boxes.....189
Surfacing with Power Tools.....198
Drill-Rod Tools Install Eyelets.....206
"Wobbler" Makes Jigsaw of Grinder....207
New Shop Ideas.....210
Removing Tape from Skin.....226
Spool Helps Clean Bike Chain.....227
Cap Iron Sets Grinding Angle.....230
Thermal "Saw" Cuts Plastics.....231
Jig Trims Fiber-Board Edges.....233
Tumbling Barrel Saves You Time.....234
Radio Clips Make Model Clamps.....235
Shield Safeguards Pulley.....237

Home Mechanics & Handicraft

Shelf Has Veneered Drawers.....180
Converting Auto Seats into Chairs.....184
Plastic Dice Boot Shakes 'Em Up.....186
Shelves and Cabinet Transform Closet....187
Accordion Conceals Small Jewelry.....188
Match and Foil Make Small Rocket.....190
Scoop Shelves Brighten Corners.....191
Serve Salad with One Hand.....202
Wastebasket Matches Floor.....227
Dowel Flips Switch When Clock Rings..230
Model Boat Takes People for Ride.....231
Collar Fits Corner Shower.....236
Drawing-Board Cabinet Holds Tools.....237
Tiny Tools Are Serving Spoons.....238
Electric Scooter Runs an Hour.....240

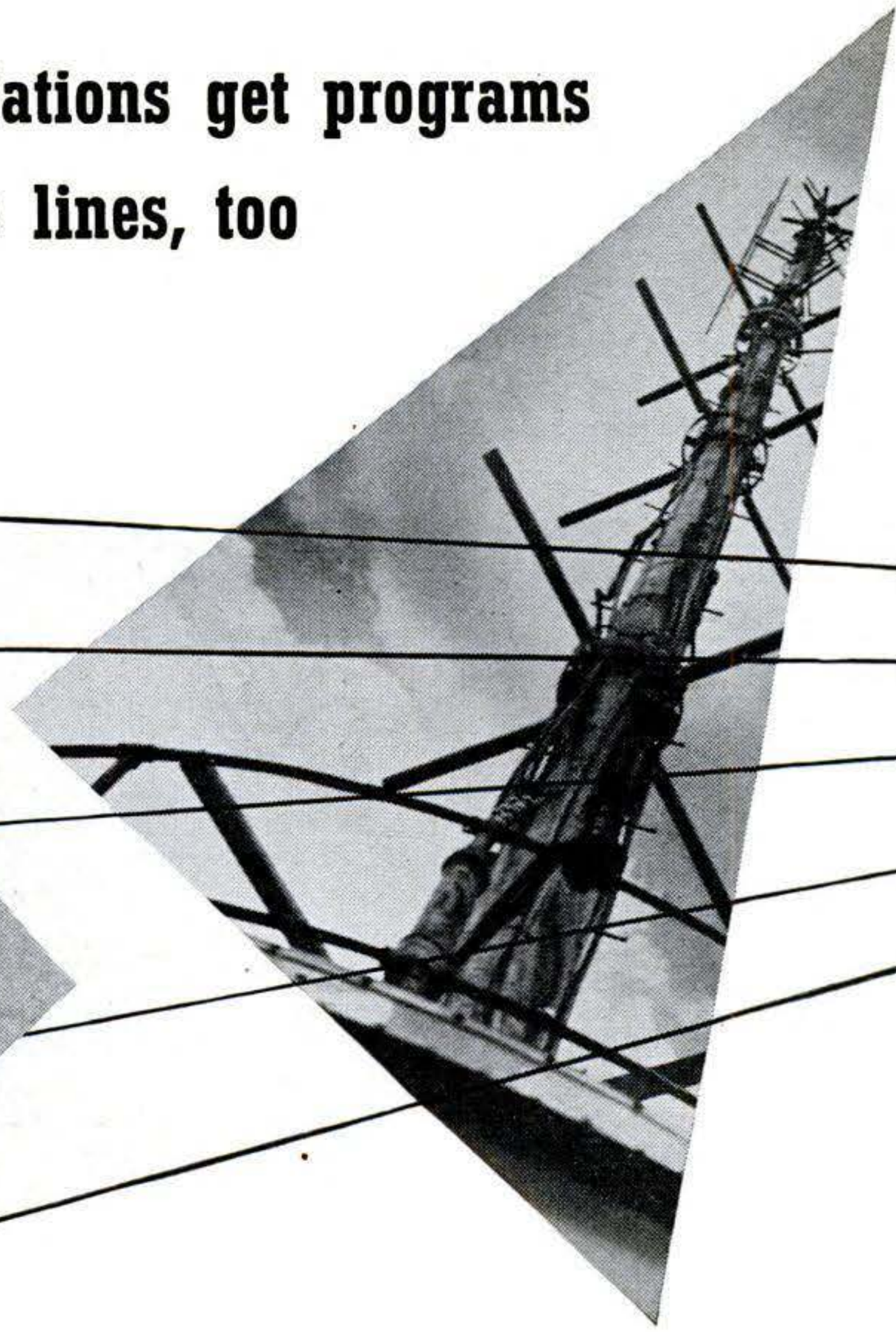
Radio & Electricity

Private Radio Cues Tele Shows.....103
Tele Image Improved.....156
Magic with Neon Glow Lamps.....192
Pocket Tester from Old Fuse.....196
Short-Wave Converter Hears World.....218
Filters Cut Fluorescent Static.....222
Washstand Houses Phono-Radio.....223
Wiring a Jug for Light.....232

Departments

Letters..... 16
The Voice of Science..... 95
What's Your Ingenuity Quotient?.....197
Keeping the Home Shipshape.....204
Photo Ideas and Equipment.....212
New Tools.....217
Aids to Modern Living.....224
Editorial Memo.....302

Television stations get programs by telephone lines, too



Thousands of pairs of wire in telephone cables radiate from every central office. That is why cable pairs will be handy to link cameras and transmitters wherever a television program may originate.

Since cable pairs are designed first for voice transmission — top frequency, about 3200 cycles per second — the loss at picture frequencies up to 4,000,000 cycles is high, so an amplifier is inserted about every mile. Equalizing networks are also needed to bring the losses at all frequencies to the same value.

Recently, the Laboratories have developed a "video pair" in which polyethylene string and tape are used instead of paper, and which has a shielding copper tape over all. It is being built into new telephone cables which go to points where television programs are certain to originate. Losses are so much less that amplifiers can be four miles apart.

Inside an all-weather sheath, "video" travels safely and reliably alongside your telephone call, a sound program, telegraph signals, pictures for tomorrow's papers. This service of the telephone cable was ready when television needed it because of Bell Laboratories activity.

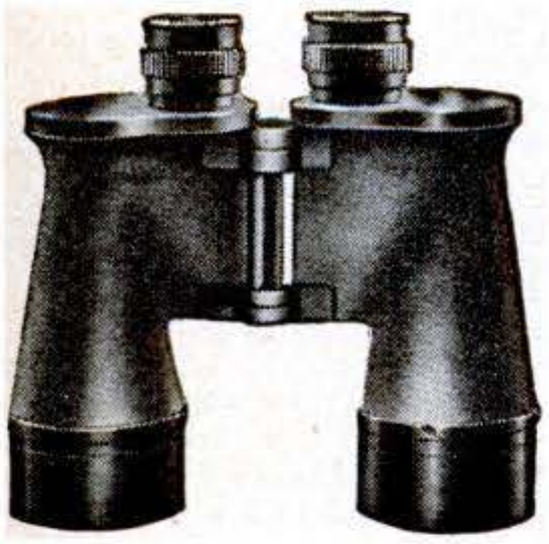
BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

Copyrighted material

WAR SURPLUS OPTICAL BARGAINS

ASSEMBLE YOUR OWN BINOCULARS!

Complete Optics! Complete Metal Parts! Save More Than ½ Regular Cost



GOVERNMENT'S 7x50 BINOCULARS

Complete Optics, new and ready for assembly. We supply full instructions. Limit—1 Set of Metal Parts and 1 Set of Optics to a customer.

METAL PARTS—Set includes all Metal Parts—completely finished—for assembly of 7 X 50 Binoculars. No machining required. Bodies have been factory hinged and covered. A sturdy Binocular Carrying Case is optional with each set of Metal Parts.

Stock #842-N $39.40

Postpaid, plus $4.80 for Case—**Total $44.20**

OPTICS—Set includes all Lenses and Prisms you need for assembling 7 X 50 Binoculars. These are in excellent condition—perfect or near-perfect—and have new low reflection coating.

Stock #5102-N . . . . . $25.00 Postpaid

NOTICE! If you buy both Binocular Optics and Binocular Metal Parts, add 20% Federal Excise Tax to above prices.

ARMY'S 6x30 BINOCULARS

No carrying Case with any Sets shown below. M-13A1 sets are waterproof model. M-3 sets are not waterproof.

COMPLETE OPTICS & METAL PARTS—Model M-13A1, 6 x 30 Binoculars. Everything you need—ready for assembly. When finished will look like a regular factory job costing $102 to $120. The Optics are new, in perfect or near-perfect condition. Have new low reflection coating. Metal Parts are new and perfect, all completely finished. No machining required. Bodies factory hinged and covered. Complete assembly instructions included.

Stock #830-N . . . . . $40.00 Postpaid, plus $8.00 tax—Total—$48.00

COMPLETE OPTICS & METAL PARTS—Model M-3, 6 x 30 Binoculars. The Optics in this set are new, perfect or near-perfect. Prisms have new low reflection coating. Factory mounted Eye Piece and Objective Assemblies not coated. Metal Parts are perfect, new, ready for assembly. When finished, this will look like a regular factory job, except a name has been filed off a cover plate. No machining required. Bodies factory hinged and covered.

Stock #831-N . . . . . $35.00 Postpaid, plus $7.00 tax—Total—$42.00

METAL PARTS ONLY—Model M-13A1, 6 x 30 Binoculars. No Optics. Same Metal Parts as described for Stock #830-N.

Stock #832-N—6 x 30 Metal Parts . . . . . **$25.00 Postpaid**

OPTICS FOR 6 x 30 BINOCULARS (No Metal Parts.) Perfect, and low reflection coated. **Stock #5130-N . . $15.00 Postpaid**

SAME OPTICS AS ABOVE (6 x 30) Coated—but slight seconds.

Stock #5124-N . . . . . $12.75 Postpaid

If you buy both the Binocular Optics and the Binocular Metal Parts, your purchase becomes subject to 20% Federal Excise Tax. Be sure to add amount covering tax to your remittance or your order cannot be filled.

Optics and Metal Parts are Available for Monoculars (½ a Binocular). For Complete Details, Write for Bulletin #14-N.

POLARIZING VARIABLE DENSITY ATTACHMENT FOR BINOCULARS

An amazingly effective unit for controlling amount of light reaching your eyes. Cuts down glare in sky and overwater observations. Easily snapped on and off over the eye cups of American-made 7x50 Binoculars Govt. cost $8.30 each.

Stock #20,000-N . . . . . $2.00 Postpaid

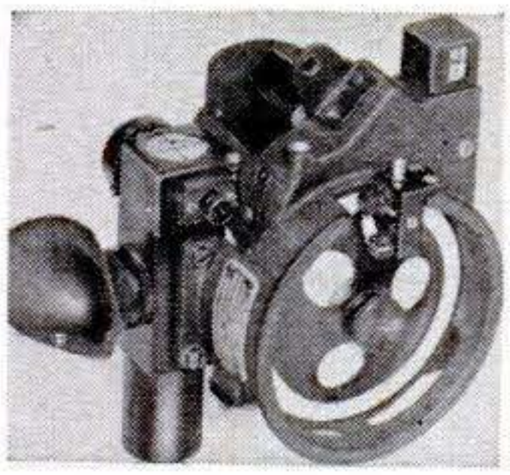
Above Polarizing Attachment also adaptable to Govt. 6 x 30 Binoculars with substitution of special Eye-cups.

Stock #20,010-N . . . . 6 x 30 Eye-cups . . . . **75¢ pr. Postpaid**

We have literally millions of war surplus lenses and prisms for sale at bargain prices. Write for Catalog "N"—Sent Free!

NEVER HAS THERE BEEN SUCH A SENSATIONAL BARGAIN AS THIS!

BUBBLE SEXTANT



These Army Air Forces Bubble Sextants cost the Govt. about $125.00 each. A real bargain at our price of $12.50! Included with Bubble Sextant shipment is wooden Carrying Case, 5 spare waxed paper discs, flashlight with rheostat for night use (uses ordinary flashlight cells—not furnished) aux. 2-power Galilean Telescope, Allen wrench, 1 spare marking point. Wartime used, but where necessary completely repaired, collimated and put in good working order. If not satisfied that Sextant is exactly as represented, return within 10 days and money will be refunded. Full directions for use accompany each shipment.

Stock #924-N . . . . . $12.50 Postpaid

Same Sextant as above, but **BRAND NEW** and with Automatic Electric Averaging Device and Illuminated Averaging Disc for nighttime use. Govt. cost $217. Though brand new we have re-checked Bubble and Collimation and GUARANTEE perfect working order.

Stock #933-N . . . . . $22.50 Postpaid

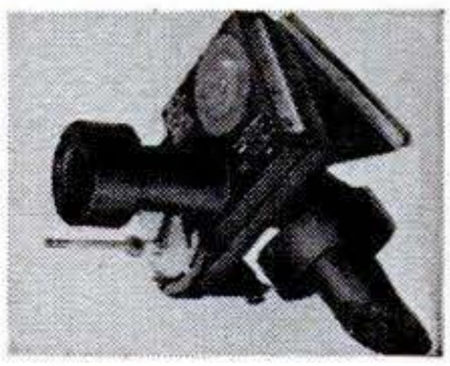
CONDENSING LENSES—Seconds, but suitable for Enlargers and Spotlights.

Stock #1061-N . . . . . 6½" dia., 9" F.L. . . . . **$2.50 Postpaid**

Stock #1082-N . . . . . 4½" dia., 5½" F.L. . . . . **70¢ Postpaid**

We Have a Limited Quantity of Condensing Lenses—seconds—ranging from 4½" to 8½" in dia. with various focal lengths. Send for Free Bulletin titled **"MISCELLANEOUS CONDENSING LENSES—N"**

$200.00 DRIFT METER for $4.95



These were used for determination of drift and true air speed. You can adapt to other uses or take apart to get 2 mounted Achromatic Lenses—Mirrors—Field Lens—Pantograph—Engraved Scales—Sponge Rubber Discs—metal parts and other components. Instrument weighs 4 lbs.

Stock 936-N . . . . . $4.95 f.o.b. Chicago, Ill.

(Shipping weight 12½ lbs.)

LENS CLEANING TISSUE—1st quality, sheet size 11" x 7½". Made to Govt. specs. Won't dust. Free of abrasives and lint.

Stock #721-N . . . . . 500 sheets . . . . . **$1.00 Postpaid**

SCHMIDT OPTICAL SYSTEM. Black plastic body, size 3-15/16" by 5-½". F.L. 2.4" . . . . . with amazing speed of F.O.9. Used in Navy's Infra-Red Sniperscope and Signalling Units. Govt. cost $134.

Stock #720-N . . . . . $6.00 Postpaid

AIR FORCES GUN SIGHT—With Polarizing Variable Density Attachment. (Polarizing attachment alone is worth many times the price of entire unit.)

Stock #908-N . . . . . $5.00 Postpaid

Same Unit Without Polarizing Attachment

Stock #916-N . . . . . $2.50 Postpaid

35 MM KODACHROME PROJECTING LENS SET—Consists of Achromatic Lens for projecting, plus a Condensing Lens and piece of Heat Absorbing Glass with directions.

Stock #4025-N . . . . . $1.95 Postpaid

MOUNTED PROJECTING LENS SYSTEM

F.L. 91.44 mm. (just right for 35 mm. Projectors). Speed of F 1.9. Outside dia. of mount at one end 60 mm. Length of mount 64 mm.

Stock #4033-N . . . . . $3.00 Postpaid

THREADED OUTSIDE MOUNT FOR FOCUSING ABOVE SYSTEM (Not Illus.)—

Stock #715-N . . . . . $1.50 Postpaid

CONDENSING LENS SET—Consists of 2 Condensing Lenses with diameter of 2". Used for making 35mm projectors or many other purposes.

Stock 4034-N . . . . . 75c Postpaid

SATISFACTION GUARANTEED • ***Order by Stock No.***

EDMUND SALVAGE CO., P. O. Audubon, New Jersey

Copyrighted material

IF you're that man, here's something that will interest you.

Not a magic formula—not a get-rich-quick scheme—but something more substantial, more practical.

Of course, you need something more than just the desire to be an accountant. You've got to pay the price—be willing to study earnestly, thoroughly.

Still, wouldn't it be worth your while to sacrifice some of your leisure in favor of interesting home study—over a comparatively brief period in your life? Always provided that the rewards were good—a salary of $3,000 to $10,000?

An accountant's duties are interesting, varied and of real worth to his employers. He has *standing!*

Do you feel that such things aren't for you? Well, don't be too sure. Very possibly they *can* be!

Why not, like so many before you, investigate LaSalle's modern Problem Method of training for an accountancy position?

Just suppose you were permitted to work in a large accounting house under the personal supervision of an expert accountant. Suppose, with his aid, you studied accounting principles and solved problems day by day—easy ones at first—then the more difficult ones. If you could do this—and if you could turn to him for advice as the problems became complex—soon you'd master them all.

That's the training you follow in principle under the LaSalle Problem Method.

You cover accountancy from the basic Principles right up through Accountancy Systems and Income Tax Procedure. Then you add C. P. A. Training and prepare for the C. P. A. examinations.

As you go along, you absorb the principles of Auditing, Cost Accounting, Business Law, Statistical Control, Organization, Management and Finance.

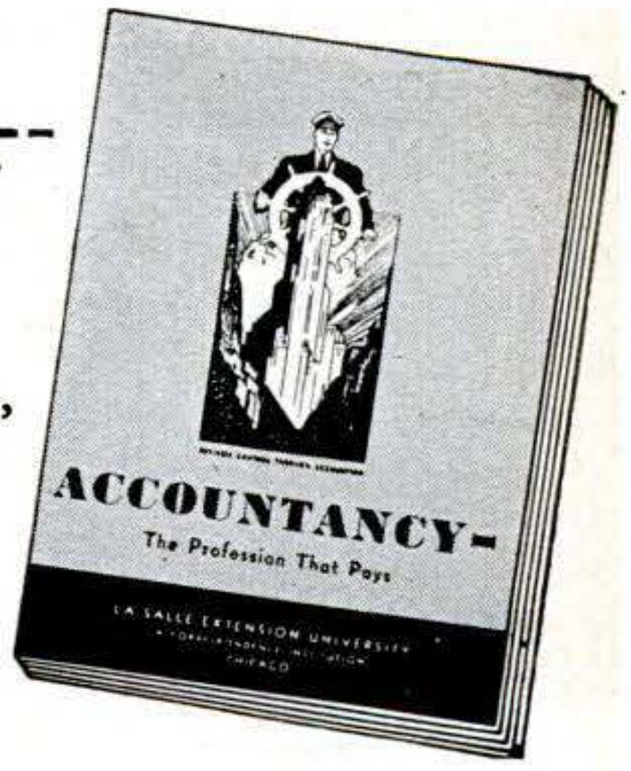
Your progress is as speedy as you care to make it—depending on your own eagerness to learn and the time you spend in study.

Will recognition come? The only answer, as you know, is that success *does* come to the man who is really *trained.* It's possible your employers will notice your improvement in a very few weeks or months. Indeed, many LaSalle graduates have paid for their training—with increased earnings—before they have completed it! For accountants, who are trained in organization and management, are the executives of the future.

Write For This Free Book

For your own good, don't put off investigation of ***all*** the facts. Write for our free 48-page book, "Accountancy, The Profession That Pays." It'll prove that accountancy offers brilliant futures to those who aren't afraid of serious home study. Send us the coupon *now.*

Over 2300 Certified Public Accountants among LaSalle alumni



LASALLE EXTENSION UNIVERSITY

A CORRESPONDENCE INSTITUTION

417 South Dearborn Street, Dept. 283-H Chicago 5, Illinois

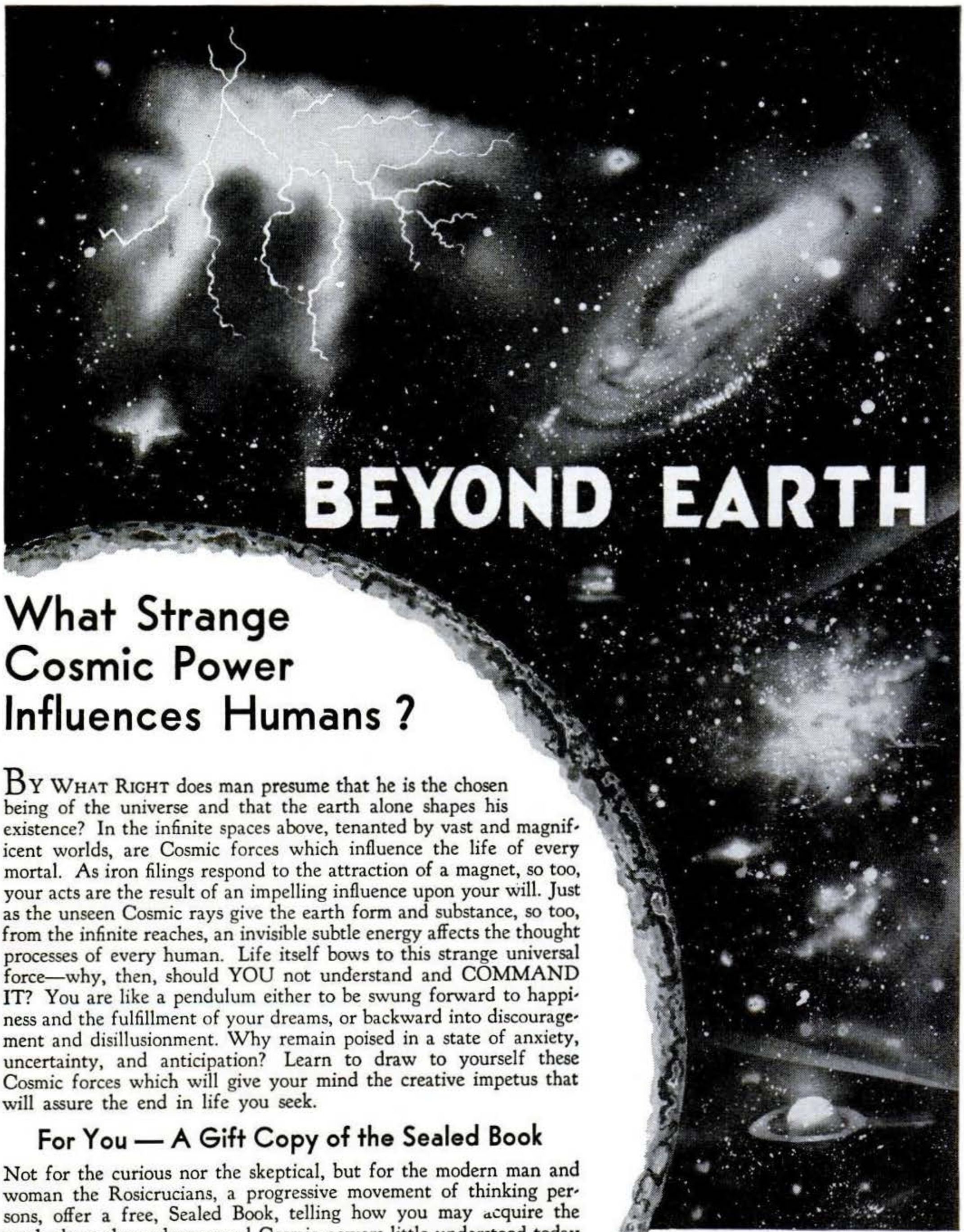
I want to be an accountant. Send me, without cost or obligation, the 48-page book, "Accountancy, The Profession That Pays," and full information about your accountancy training program.

Name.....

Address..... *City*.....

Position..... *Age*.....

Copyrighted material



What Strange Cosmic Power Influences Humans ?

BY WHAT RIGHT does man presume that he is the chosen being of the universe and that the earth alone shapes his existence? In the infinite spaces above, tenanted by vast and magnificent worlds, are Cosmic forces which influence the life of every mortal. As iron filings respond to the attraction of a magnet, so too, your acts are the result of an impelling influence upon your will. Just as the unseen Cosmic rays give the earth form and substance, so too, from the infinite reaches, an invisible subtle energy affects the thought processes of every human. Life itself bows to this strange universal force—why, then, should YOU not understand and COMMAND IT? You are like a pendulum either to be swung forward to happiness and the fulfillment of your dreams, or backward into discouragement and disillusionment. Why remain poised in a state of anxiety, uncertainty, and anticipation? Learn to draw to yourself these Cosmic forces which will give your mind the creative impetus that will assure the end in life you seek.

For You — A Gift Copy of the Sealed Book

Not for the curious nor the skeptical, but for the modern man and woman the Rosicrucians, a progressive movement of thinking persons, offer a free, Sealed Book, telling how you may acquire the truth about these phenomenal Cosmic powers little understood today and which make for freedom and attainment in life. THIS IS THE DAY AND AGE OF MASTERY. Throw off the age-old custom of—"let life be as it may"—and learn to *create it as you wish it.*

USE THIS GIFT COUPON

Scribe **C. Y. N.** The Rosicrucians (AMORC)
Rosicrucian Park, San Jose, California.

Please send me without obligation the free, Sealed Book, which tells how I may obtain the unusual facts about the Cosmic forces which affect my life.

NAME.....

ADDRESS.....

CITY..... STATE.....

The ROSICRUCIANS
(AMORC)
SAN JOSE. CALIFORNIA

The Rosicrucians are NOT a Religious Organization

Copyrighted material

AUDELS REFRIGERATION & AIR CONDITIONING GUIDE.....$4

New from Cover to Cover—1280 Pages, Fully Illus. Covering basic principles, servicing, operation & repair of household, commercial & industrial refrigeration & air conditioning. A gold mine of essential important facts for engineers, servicemen, users.

AUDELS CARPENTERS & BUILDERS GUIDES—4 Vols. $6

A practical illustrated trade assistant on modern construction for carpenters, joiners, builders, mechanics and all woodworkers. 4 vols., 1600 pages, 3700 illustrations, flexible covers. Pocket size. Each volume sold separately $1.50 a vol.

AUDELS AUTOMOBILE GUIDE.....$4

A practical quick ready reference book for auto mechanics, service men, operators & owners. Explains theory, construction & servicing of modern motor cars, trucks, buses & auto type Diesel engines. 1700 pages, fully illustrated. 55 chapters. Indexed. A standard book for mechanics. New fluid drive covered.

AUDELS DIESEL ENGINE MANUAL..$2

A practical, concise treatise with questions and answers on the theory, operation and maintenance of modern diesel engines including General Motors 2 cycle Diesel. 384 pages, fully illus., flexible binding, pocket size. All details plainly brought out, this book is of extreme value to engineers, operators & students.

AUDELS WIRING DIAGRAMS.....$1

210 Pages. Illustrated. Gives practical facts on wiring of electrical apparatus. It shows clearly how to wire apparatus for practically all fields of electricity. Each diagram is complete & self-explanatory. Highly Endorsed Pocket Companion.

AUDELS PLUMBERS & STEAMFITTERS GUIDES—4 Vols. $6

A Practical Trade Assistant & Ready Reference. Explains in plain language & by clear illustrations, diagrams, charts, graphs, pictures principles of modern plumbing practice including Marine Pipe Fitting and Air Conditioning. 4 Vols.—1670 Pages—3642 Diagrams. Pocket size. Each Vol. Sold Separately $1.50 a Vol.

AUDELS SHEETMETAL WORKERS HANDY BOOK.....$1

Practical inside information. Fundamentals of Sheet Metal Work. 388 pages. Illustrated. 11 sections. Clearly written. Essential & important facts, figures, pointers in everyday language. Ref. Index.

AUDELS SHEETMETAL PATTERN LAYOUTS.....$4

Developed by Experts for Sheet Metal Workers, Layout Men & Mechanics. A Practical Encyclopedia in 10 Sections, size 7 x 10 x 2—1125 Pages—350 Layouts—1600 Illustrations. 1001 Key Facts. Fully indexed for ready reference in answering your layout problems. Covers all phases of sheet metal work including Pattern Cutting, Pattern Development & Shop Procedure.

AUDELS ANSWERS ON BLUE PRINT READING.....$2

For Mechanics & Builders. Covers all types of blue print reading including ship & airplane. 416 pages, fully illustrated.

AUDELS NEW MACHINIST & TOOLMAKERS HANDY BOOK.....$4

Covers modern machine shop practice in all its branches. 5 practical books in 1. New from cover to cover. Tells how to set up & operate lathes, screw and milling machines, shapers, drill presses and all other machine tools. 1600 pages, fully illustrated, 5 x 6½ x 2. Indexed. 5 sections. 1—Modern Machine Shop Practice. 2—Blue Print Reading & How to Draw. 3—Calculations & Mathematics for Machinists. 4—Shop Physics. 5—How to Use the Slide Rule. 60 chapters. Easy to read and understand. A shop companion that answers your questions.

AUDELS MATHEMATICS & CALCULATIONS FOR MECHANICS $2

Mathematics for home study or reference. 700 pages, 550 illus. Practical mathematics from beginning. How to figure correctly. Easy, correct methods covering complete review. Illus. & Indexed.

AUDELS HANDY BOOK OF PRACTICAL ELECTRICITY.....$4

For maintenance engineers, electricians & all electrical workers. 1440 Pages, 2600 Illus. Covers important electrical information in handy form—including Marine Wiring, Radio Principles, Welding. Indexed. A Key to a practical understanding of electricity.

AUDELS RADIOMANS GUIDE.....$4

A key to the practical understanding of radio including Frequency Modulation, Television, etc., Aircraft & Marine Radio. For radio engineers, servicemen, amateurs, 914 Pages, 633 Illustrations & Diagrams. Photos. Review Questions & Answers, Reference Index. Authentic, clear, concise.

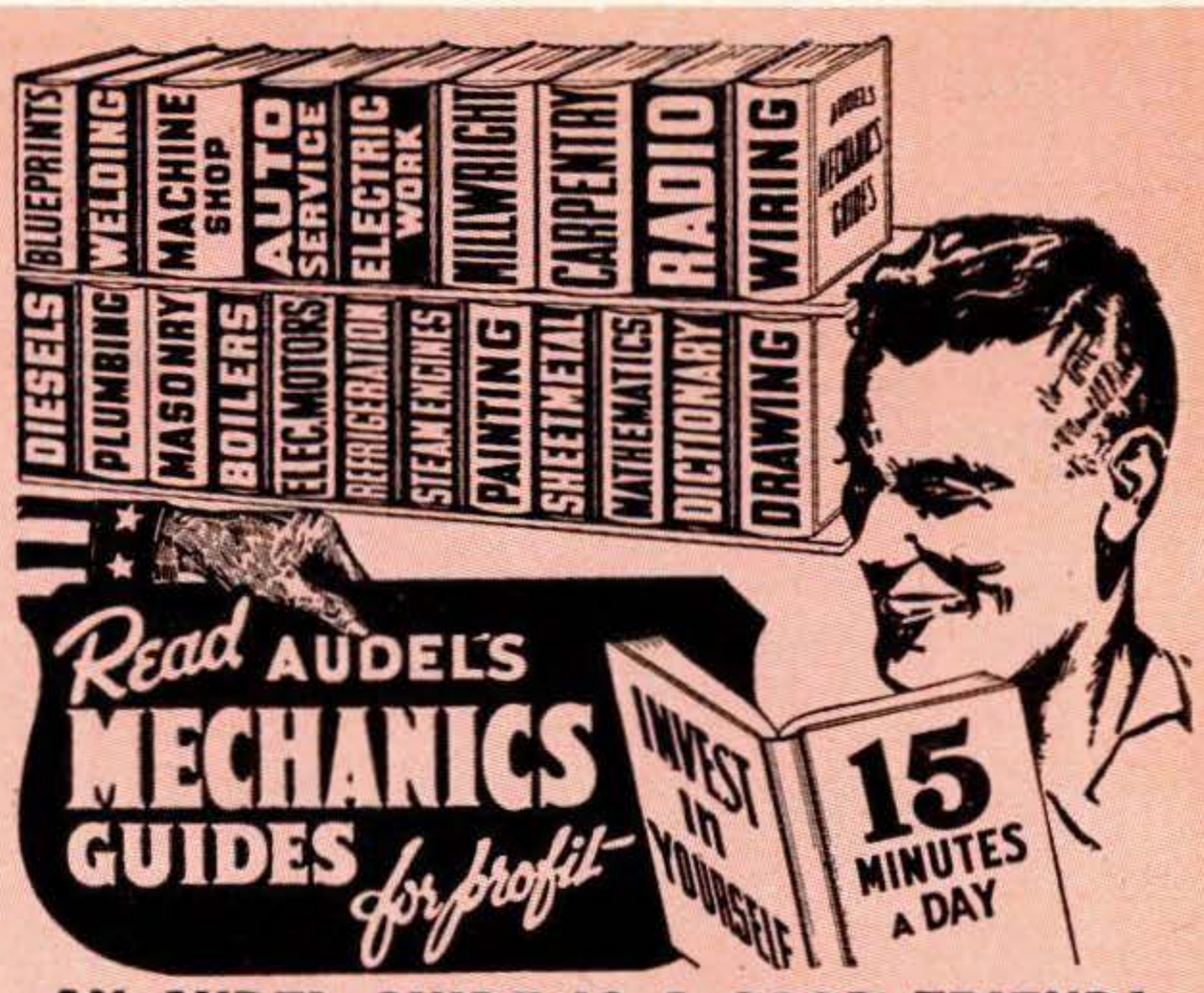
AUDELS ELECTRONIC DEVICES.....$2

Tells What You Want to Know About Electric Eye. Easily Understood. Covers photo-electric cells & their applications. Amplifiers, illumination, frequencies, voltage, photocell, tubes, Ohm's Law, wiring diagrams, etc.

AUDELS WELDERS GUIDE.....$1

A concise, practical text on operation & maintenance of all welding machines for all mechanics. Over 400 pages, illustrated. Covers all methods of electric and acetylene welding including airplane work.

AUDEL, Publishers, 49 W. 23 St., N. Y. 10



AN AUDEL GUIDE IS A GOOD FRIEND!

Step Up Your Own Skill with the Practical Facts and Figures of Your Trade. Save time and money with right methods, short cuts, labor saving ideas. CHECK NOW! You can look over any Audel Guide in your home. Start the Easy Payments if satisfied.

CUT HERE

MAIL ORDER

THEO. AUDEL & CO., 49 W. 23 St., New York 10, N. Y.

Please mail me for 7 days' free examination the books marked (X) below. I agree to mail $1 in 7 days on each book or set ordered, and to further mail $1 a month on each book or set ordered until I have paid purchase price. If I am not satisfied with Guides I will return them.

- ☐ Audels ELECTRIC MOTOR GUIDE . . . . . $4.
- ☐ Audels OIL BURNER GUIDE . . . . . 1.
- ☐ Audels REFRIGERATION & Air Conditioning Guide . 4.
- ☐ Audels POWER PLANT ENGINEERS GUIDE . . . 4.
- ☐ Audels PUMPS, HYDRAULICS & AIR COMPRESSORS 4.
- ☐ Audels WELDERS GUIDE . . . . . 1.
- ☐ Audels BLUE PRINT READING . . . . . 2.
- ☐ Audels SHEET METAL WORKERS Handy Book . . 1.
- ☐ Audels SHEET METAL PATTERN LAYOUTS . . . 4.
- ☐ Audels AIRCRAFT WORKER . . . . . 1.
- ☐ Audels MATHEMATICS and CALCULATIONS . . . 2.
- ☐ Audels MACHINISTS & TOOLMAKERS Handy Book 4.
- ☐ Audels MECHANICAL Dictionary . . . . . 4.
- ☐ Audels AUTOMOBILE GUIDE . . . . . 4.
- ☐ Audels DIESEL ENGINE MANUAL . . . . . 2.
- ☐ Audels MARINE ENGINEERS Handy Book . . . . 4.
- ☐ Audels MECHANICAL DRAWING GUIDE . . . . 1.
- ☐ Rogers MECHANICAL DRAWING and DESIGN . . 2.
- ☐ Audels MILLWRIGHTS and Mechanics Guide . . . 4.
- ☐ Audels CARPENTERS and Builders Guides (4 vols.) . 6.
- ☐ Audels PLUMBERS and Steamfitters Guides (4 vols.) 6.
- ☐ Audels MASONS and Builders Guides (4 vols.) . . . 6.
- ☐ Master PAINTER and DECORATOR . . . . . 2.
- ☐ Audels GARDENERS & GROWERS GUIDES (4 vols.) 6.
- ☐ Audels ENGINEERS & FIREMANS EXAMINATIONS 1.
- ☐ Audels ENGINEERS and Mechanics Guides Nos. 1, 2, 3, 4, 5, 6, 7 and 8 complete . . . . . 12.
- ☐ Audels Answers on Practical ENGINEERING . . . 1.
- ☐ Audels ELECTRICIANS EXAMINATIONS . . . . 1.
- ☐ Audels WIRING DIAGRAMS . . . . . 1.
- ☐ Audels Handy Book of PRACTICAL ELECTRICITY . 4.
- ☐ Audels ELECTRICAL POWER CALCULATIONS . . 2.
- ☐ Audels ELECTRONIC DEVICES . . . . . 2.
- ☐ Audels ELECTRIC Dictionary . . . . . 2.
- ☐ Audels RADIOMANS GUIDE . . . . . 4.
- ☐ Audels NEW ELECTRIC LIBRARY at $1.50 a Volume Vols. I, II, III, IV, V, VI, VII, VIII, IX, X, XI, XII

*Name*_____

*Address*_____

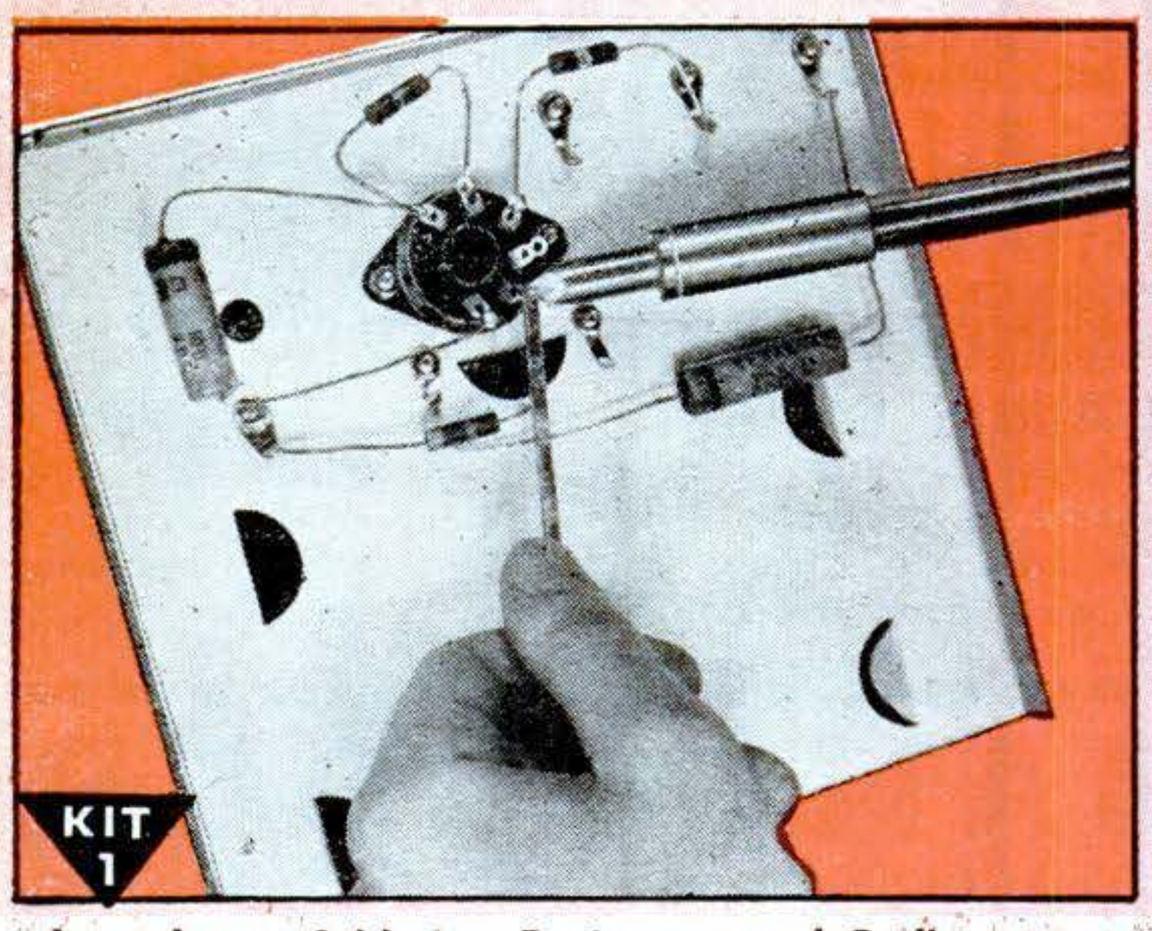
*Occupation*_____

PSM

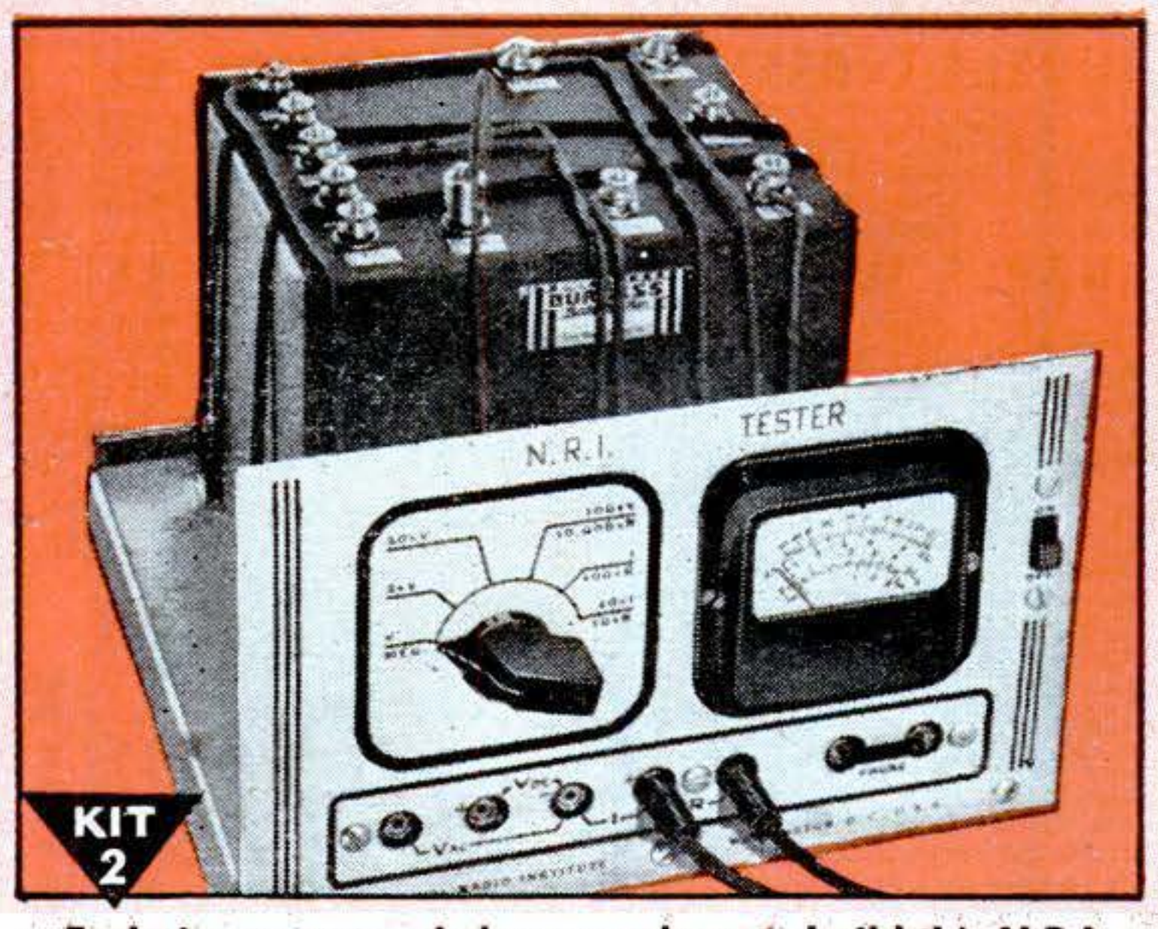
*Employed by*_____

Copyrighted material

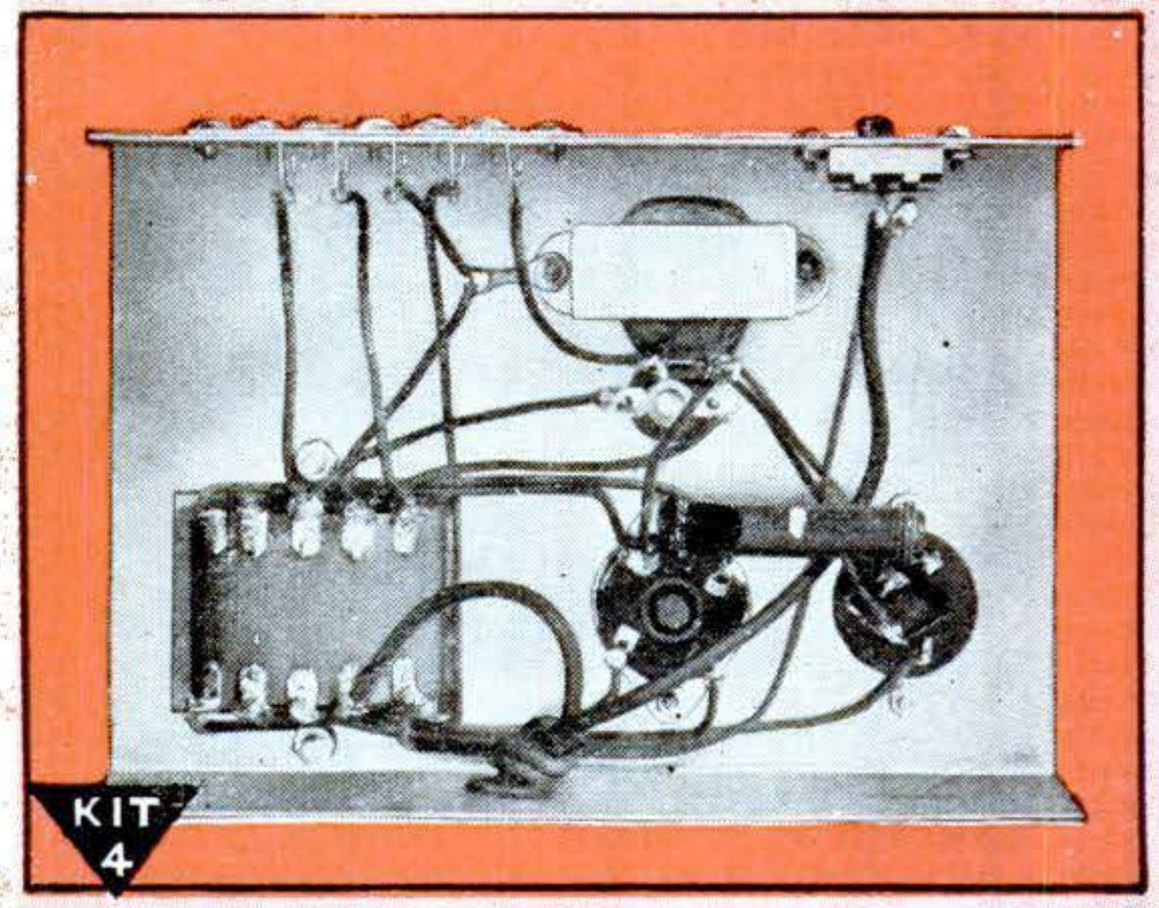
I Will Show You How to Learn RADIO



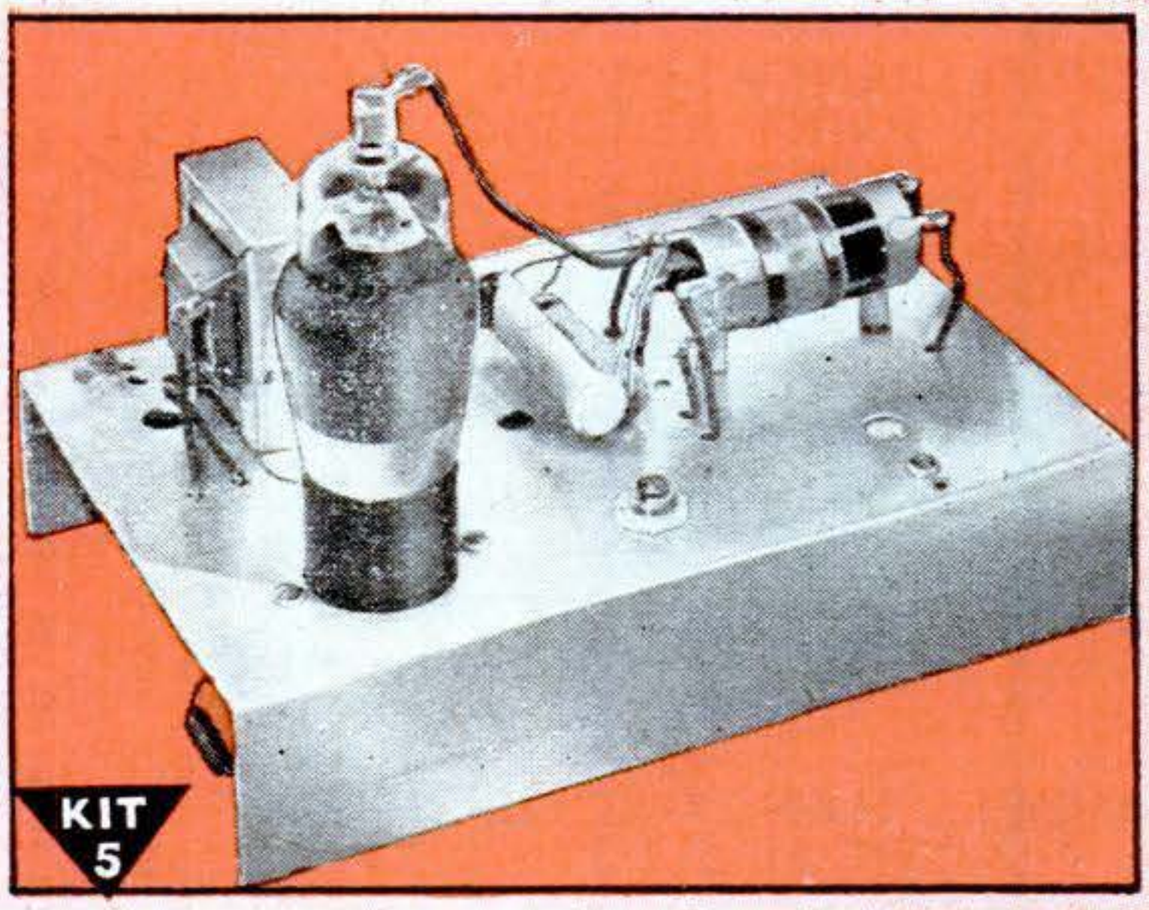
I send you Soldering Equipment and Radio parts; show you how to do Radio soldering, how to mount and connect Radio parts; give you practical experience.



Early in my course I show you how to build this N.R.I. Tester with parts I send. It soon helps you fix neighborhood Radios and earn EXTRA money in spare time.



You get parts to build this Vacuum Tube Power Pack; make changes which give you experience with packs of many kinds; learn to correct power pack troubles.



Building this A. M. Signal Generator gives you more valuable experience. It provides amplitude-modulated signals for many tests and experiments.

MEN I TRAIN AT HOME GET GOOD JOBS LIKE THESE

Made $612, in 12 Months, Spare Time

"Soon after I finished my experimental kits lessons I tackled my first Radio service job. The neighbors were very cooperative. I soon had all the repair jobs I could handle in spare time. I have made $612 in the past 12 months in spare time."—J. W. CLARK, Wilmington, N. C.

Minister Makes $10-$20 Weekly Spare Time

"I am a minister. I am in a county seat now trying to serve the people in my church, also trying to keep their Radios playing. I have been making from $10 to $20 per week in spare time." — L. H. SMITH, Benton, Tenn.

Knew Nothing About Radio

"I knew nothing about Radio when I enrolled. At present I am doing spare time work. I have more than paid for my Course and I have about $200 worth of equipment which has paid for itself."—RAYMOND HOLTCAMP, Vandalia, Ill.

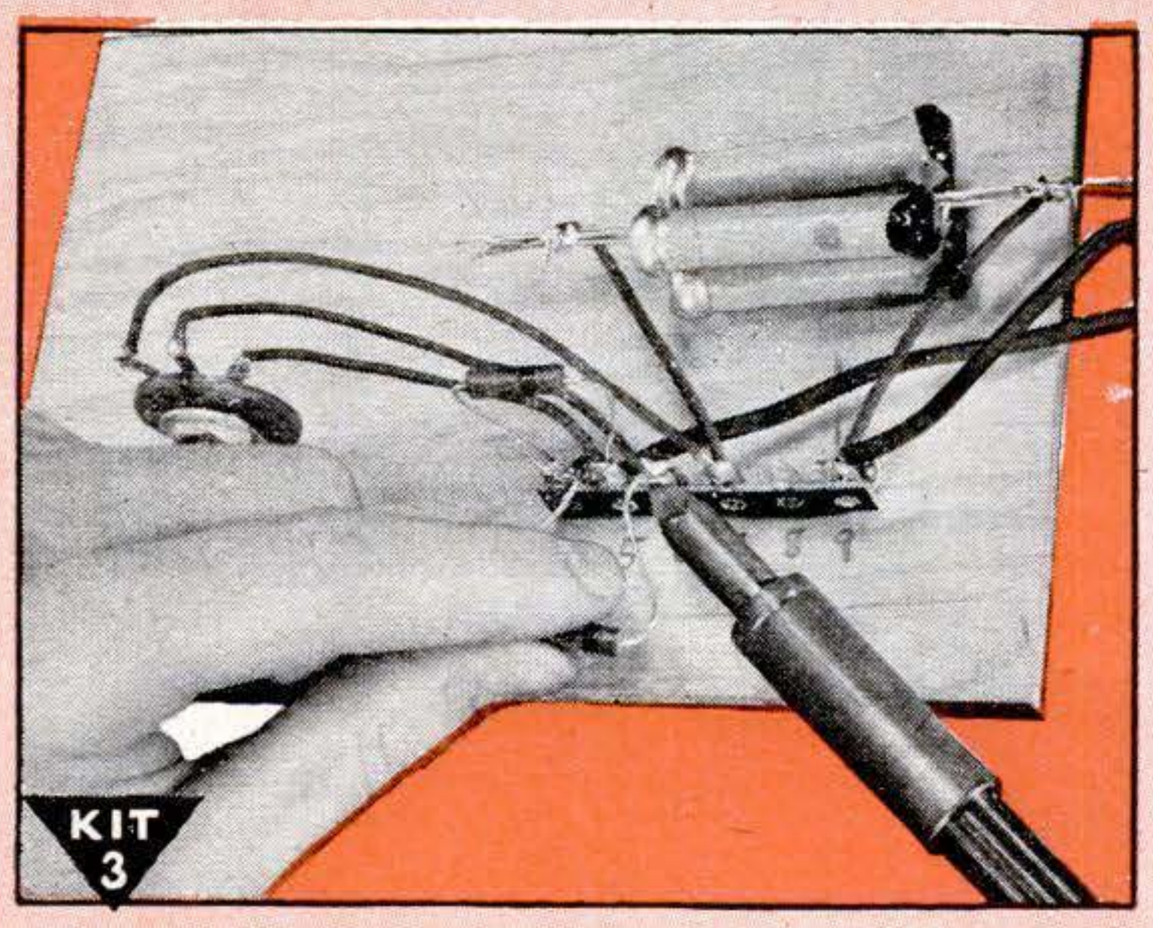
Doing Good Spare Time Business

"I have been getting receivers to repair right along lately, and by using the methods taught me in the NRI Course, I don't have to spend much time on any of them."—STANLEY N. STRICKLAND, 191 Dale Homes, Portsmouth, Va.

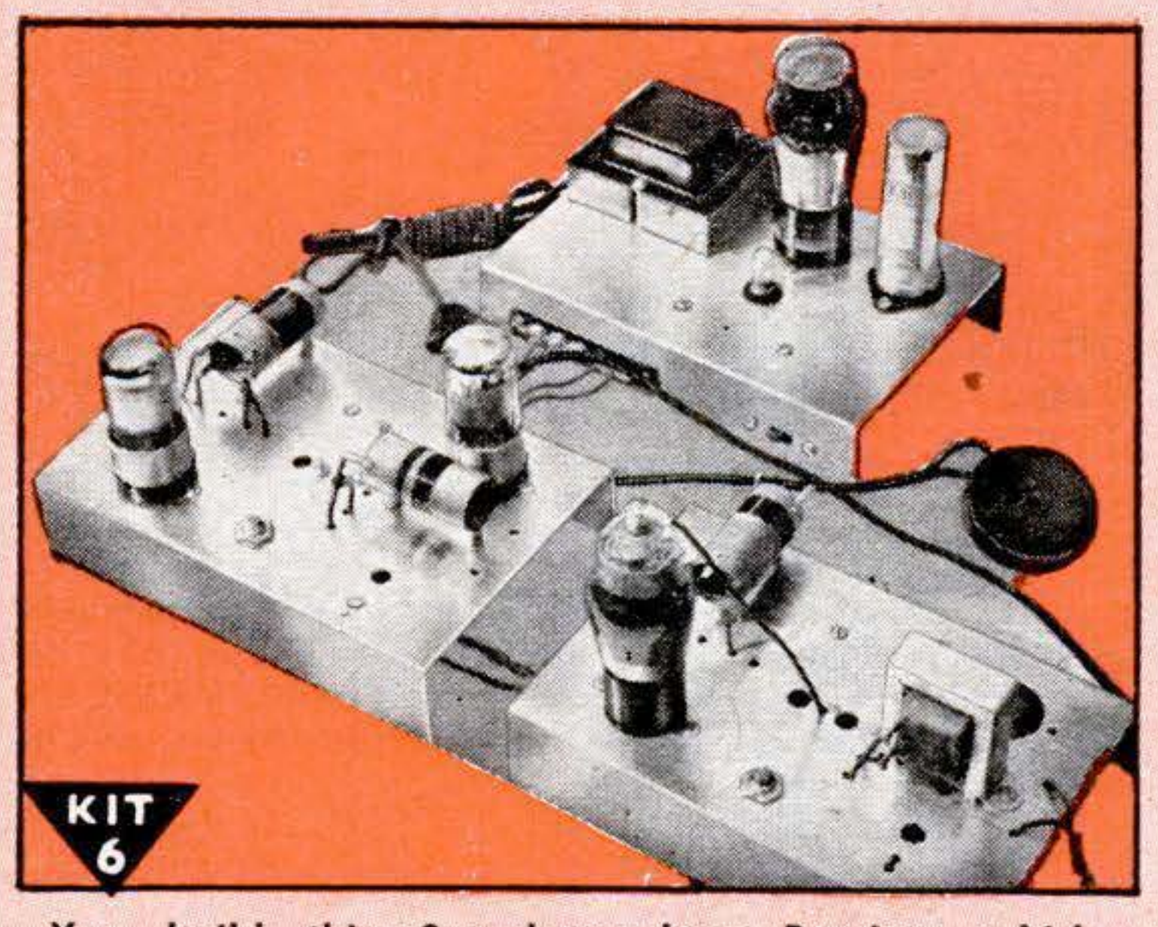
Copyrighted material

by Practicing in Spare Time

I Send You Big Kits of Radio Parts



You get parts to build Radio Circuits; then test them; see how they work; learn how to design special circuits; how to locate and repair circuit defects.



You build this Superheterodyne Receiver which brings in local and distant stations—and gives you more experience to help you win success in Radio.

KNOW RADIO *Win Success*

I Will Train You at Home

DO YOU want a good-pay job in the fast-growing Radio Industry—or your own Radio Shop? Mail the Coupon for a Sample Lesson and my 64-page book, "How to Be a Success in RADIO — Television, Electronics," both FREE. See how I will train you at home—how you get practical Radio experience building, testing Radio circuits with BIG KITS OF PARTS I send!

VETERANS

You can get this training in your own home under G.I. Bill. Mail coupon for full details.

Many Beginners Soon Make Extra Money in Spare Time While Learning

The day you enroll I start sending EXTRA MONEY manuals that show how to make EXTRA money fixing neighbors' Radios in spare time, while still learning! It's probably easier to get started now than ever before, because the Radio Repair Business is booming. Trained Radio Technicians also find profitable opportunities in Police, Aviation, Marine Radio, Broadcasting, Radio Manufacturing, Public Address work. Think of even **greater** opportunities as Television, FM, and Electronic devices become available to the public! Send for FREE books now!

Find Out What NRI Can Do For You

Mail Coupon for Sample Lesson and my FREE 64-page book. Read the details about my Course, letters from men I trained; see how quickly, easily you can get started. No obligation! Just MAIL COUPON NOW in envelope or paste on penny postal. **J. E. SMITH, President, Dept. 8BP3, National Radio Institute,** *Pioneer Home Study Radio School,* **Washington 9, D. C.**

Our 34th Year of Training Men for Success in Radio

MAIL NOW!

Mr. J. E. SMITH, President, Dept. 8BP3, National Radio Institute, Washington 9, D. C.

Mail me FREE, your Sample Lesson and 64-page book. (No salesman will call. Please write plainly.)

Age.....

Name.....

Address.....

City.....State.....
(Please include Post Office zone number)

Approved for Training under GI Bill

SAMPLE LESSON FREE

Gives hints on Receiver Servicing, Locating Defects, Repair of Loudspeaker, I.F. Transformer, Gang Tuner, Condenser, etc. Mail Coupon

My Radio Course Includes

TELEVISION • ELECTRONICS

FREQUENCY MODULATION

Copyrighted material

FOUR CAREER FIELDS

TECHNICAL CRAFTS — Training For Success — CORPORATION

FOR YOUR SUCCESS

PLASTICS

This student is learning to operate a hydraulic press used to mold thermo-setting plastics. Plastic Institute's modern laboratories and shops provide training facilities which are thoroughly practical!

PLASTICS AND YOUR FUTURE!

Decide to make your future career in some branch of Plastics. Then you've hitched your future to a young, growing industry. Why? Because more and more products are being made successfully from some type of plastic. Fabrics, poker chips, toys, kitchenware, lamp shades, radio cabinets, fly rod containers, golf clubs and thousands more—useful, everyday products. This means a bigger industry, more jobs, more opportunities for men to operate their own business—MORE OPPORTUNITIES FOR TRAINED PLASTICS MEN AND WOMEN.

PLASTICS INSTITUTE is the oldest and largest training school devoted entirely to Plastics education. Headed by widely known leaders in the Plastics Industry, the complete training program, both HOME STUDY AND RESIDENT SCHOOL, has been carefully designed to equip men and women to enter the Plastics Industry with the knowledge necessary to get ahead.

GET KIT OF PLASTIC MATERIALS

You receive practical experience making useful, attractive articles as part of your Home Study training. Many students have earned money selling articles of their own manufacture. It's creative and exciting.

GET FREE LITERATURE. MAIL COUPON TODAY.

See what Plastics Industries Technical Institute offers you and read what many successful graduates say about their training. Mail coupon below for complete information. Be sure to indicate whether you are interested in HOME TRAINING or desire to come to Los Angeles, California, for resident training.

Approved for Veterans—Non-Veterans

Plastics Industries Technical Institute
Dept. PS4-2-8, 1601 S. Western Ave., Los Angeles 6, Calif.

Gentlemen: Please send me free literature and information on your practical courses. I am interested in Home Training ☐ attending school in Los Angeles ☐.

Name (Print) .....

Street ..... Age .....

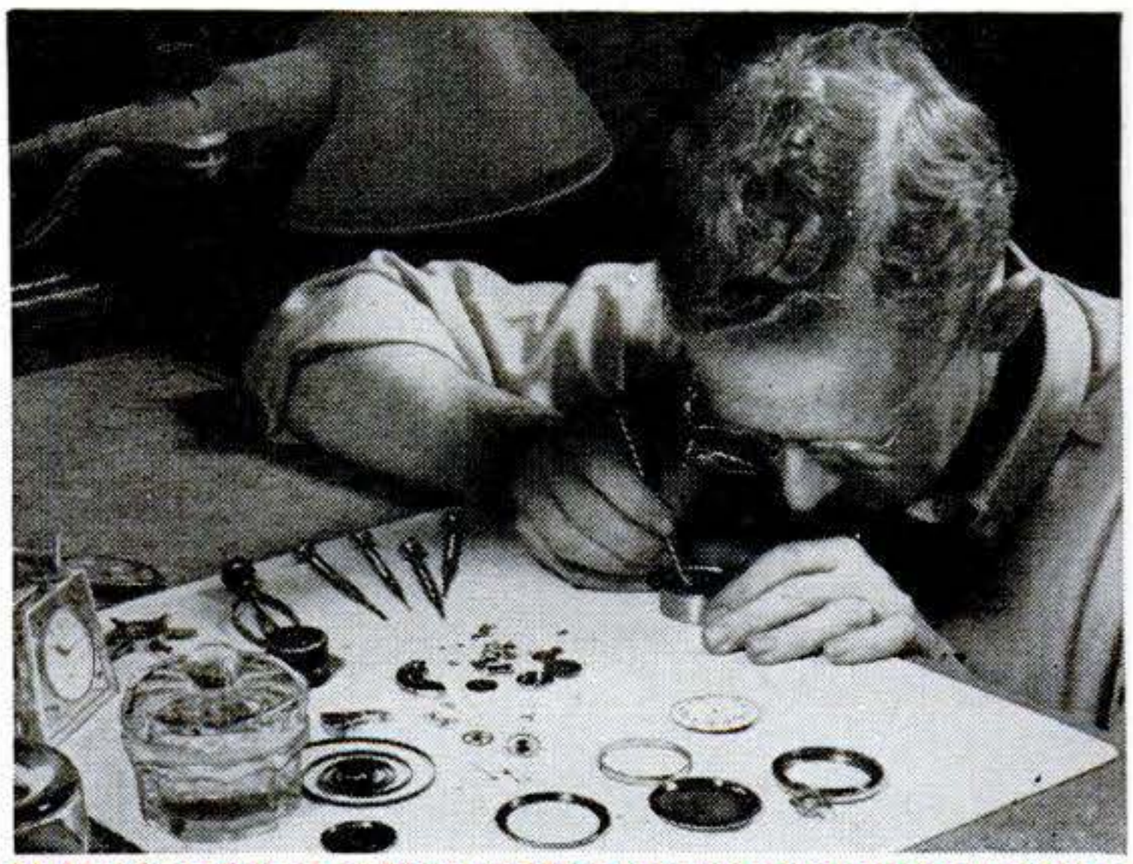
City ..... Zone .... State .....

Veteran ..... Non-Veteran .....

WATCHMAKING

What TIME do you get up?
What TIME do you go to work?
What TIME does your train leave?
What TIME do you eat lunch?
What TIME does the game start?
What TIME do you have dinner?
What TIME does the movie start?

Everyone is guided by TIME. That is the reason why it is important for you to seriously consider WATCHMAKING as your career. This interesting field demands trained minds and hands. You can get this training at American School of Watchmaking.



At American School of Watchmaking students get the best of training under the careful supervision of expert instructors.

YOUR OWN BUSINESS

Trained men and women in Watchmaking can get into business for themselves, or work for good pay in pleasant surroundings. Many students of AMERICAN SCHOOL OF WATCHMAKING are achieving success in this profitable field.

STUDY IN GLAMOROUS CALIFORNIA

Enroll in American School of Watchmaking and combine your serious training program with all that Southern California offers you.

Member of: United Horological Association
National Council Technical Schools

Approved for Veterans—Non-Veterans

American School of Watchmaking
Dept. PS4-2-8, 5145 W. San Fernando Rd.
Los Angeles 26, Calif.

Gentlemen: Please send me free booklet and information on your training.

Name (Print) .....

Street ..... Age .....

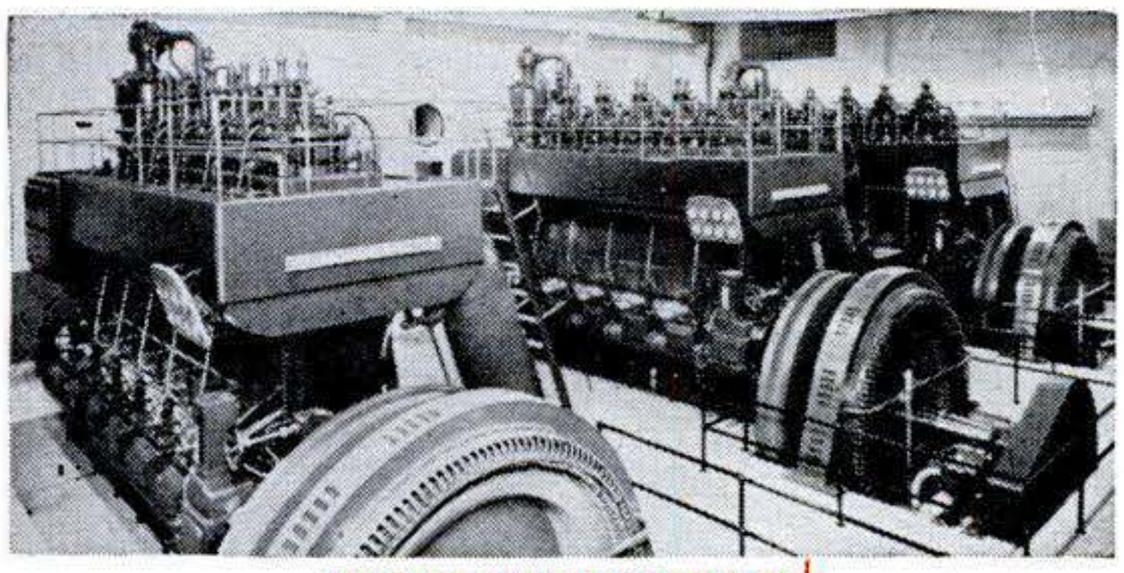
City ..... Zone .... State .....

Veteran ..... Non-Veteran .....

Copyrighted material

CHOOSE THE ONE — TECHNICAL CRAFTS — Training For Success — CORPORATION — **THAT FITS YOU BEST**

DIESEL



A typical modern Diesel plant.

If you are mechanically inclined and ambitious to get into a field offering a great future—then LEARN DIESEL THE HEMPHILL WAY! Many successful Hemphill School graduates have positions of responsibility operating, installing, repairing, and servicing Diesel engines in trucks, ships, power plants, logging operations, construction jobs and other fields. The scope and future of the trained Diesel man is broad and offers opportunities to specialize. If you want to see the world, remember, Diesels are used in transportation, mining, construction and drilling operations in distant countries. Perhaps you like agriculture or railroading or shipping—in almost every field you find Diesels. And remember, trained Diesel men are required to operate and maintain them. YOU CAN BE A TRAINED DIESEL MAN. You can learn quickly and easily the famous HEMPHILL WAY!

STUDY AT HOME

Learn Diesel at home in your spare time, without interfering with your present activities. Easy-to-understand HOME STUDY course result of years of Hemphill Schools' successful teaching. Or take practical resident school training at Los Angeles, New York or Memphis. INDICATE YOUR CHOICE ON COUPON BELOW.

Hemphill Specialized Automotive Engine, Carburetor, Electrical and Ignition Tune-up Course offered at Los Angeles and Memphis. Check coupon.

Approved for Veterans—Non-Veterans

Hemphill Diesel and Automotive Schools
Administrative Office: 1601 South Western Ave.
Dept. PS 4-2-8, Los Angeles 6, California

Gentlemen: Please send me FREE BOOKLET and information on your Diesel Courses. I am interested in Home study ☐ Resident School ☐ at New York ☐ Memphis ☐ Los Angeles ☐ Send information on Auto Tune-up at Memphis ☐ Los Angeles ☐

Name.....Age.....

Street.....Zone.....

City.....State.....

Veteran.....Non-Veteran.....

AIRCRAFT INSTRUMENTS

After overhauling a Rate of Climb Indicator, student tests it for proper range deflection, maintaining very rigid tolerances, on a special test unit.

This student is testing for accuracy a Turn and Bank Indicator against time, using a stop watch, and against another instrument of known accuracy.

FLASH! C-54 four-engined Skymaster, known as "The Big Push" flies Atlantic without a hand on the controls!

Delicate INSTRUMENTS made this feat possible! TRAINED AIRCRAFT INSTRUMENT TECHNICIANS manufactured, installed and serviced these instruments. Such men are essential to the continuing progress of Aviation!

GET INTO THIS IMPORTANT FIELD!

American Schools of Aircraft Instruments teaches you in 34 short weeks to qualify as an Instrument Technician. Hundreds of successful graduates employed in the industry or have own business.

HERE'S WHAT YOU LEARN

At A.S.A.I. you study instruments in pressure, mechanical and gyroscopic groups. Installation, service, repair and line maintenance. Aircraft instrument training also applicable to many industrial fields.

Come to American Schools of Aircraft Instruments in Los Angeles where much Aviation history begins and where you can enjoy all else that Southern California offers you.

Approved by National Council of Technical Schools. C.A.A. approved Instrument Repair Station License No. 1028.

Approved for Veterans—Non-Veterans

American Schools of Aircraft Instruments
Dept. PS 4-2-8, 5145 W. San Fernando Rd.
Los Angeles 26, Calif.

Gentlemen: Please send me FREE and WITHOUT OBLIGATION, illustrated booklet describing Aircraft Instrument field.

Name (Print).....

Street.....Age.....

City.....Zone....State.....

Veteran.....Non-Veteran.....

Copyrighted material

I'll Send You 8 Big Kits of Training Equipment *including*

TWO-BAND 6 TUBE SUPER RECEIVER AND 16 RANGE METER SET-UP *for Testing*

Learn Fast . . . Earn Fast

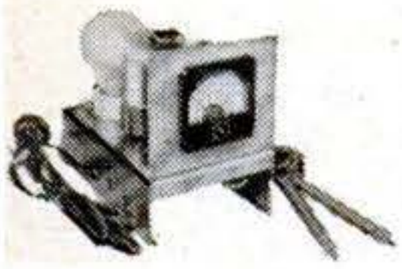
HOME TRAINING Planned For Your Needs

You Build All These

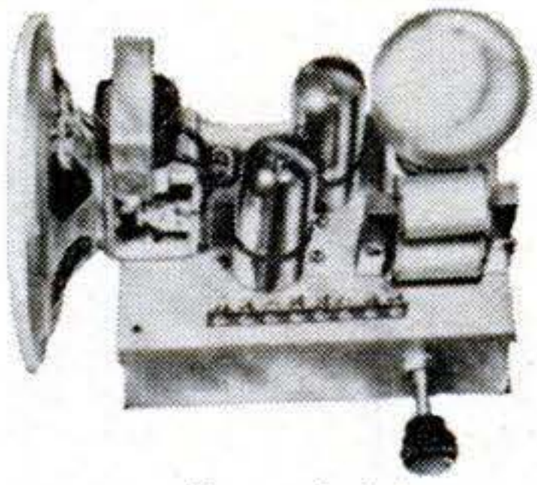
TESTERS . . . and MORE!

PRACTICE WITH YOUR OWN HANDS!
Mind training through hand practice, that's the only way to LEARN and REMEMBER Radio. It's the most successful of Home Training methods.

OVER 175 PRACTICAL EXPERIMENTS
You'll find out how to build countless Radio Circuits. You'll learn a new, fast way to test Radio Sets without mfg. Equipment.



I give you a fine, moving-coil type Meter Instrument on Jewel Bearings—with parts for a complete Analyzer Circuit Continuity Tester. You learn how to check and correct Receiver defects with professional speed and accuracy.

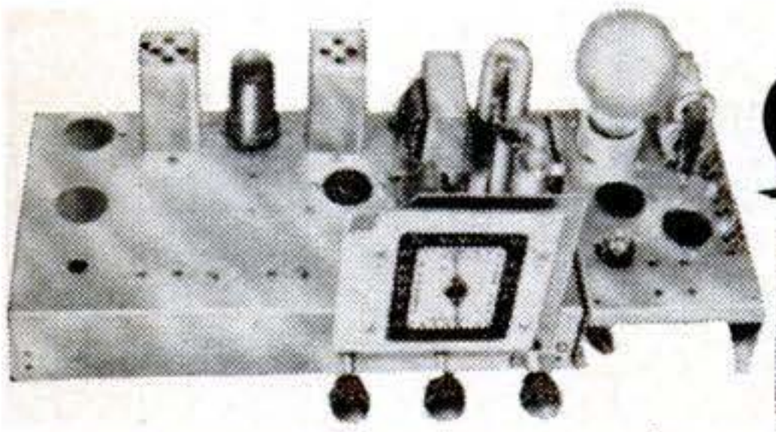


Practice *Does It!*
Soldering, wiring, connecting Radio Parts . . . building circuits with your own hands — you can't beat this method of learning. When you construct this Rectifier and Filter Resistor and Condenser Tester, etc., you get a really practical slant on Radio that leads to a money-making future.

LOW COST HOME RADIO TRAINING!

Easy Monthly Payments!

My perfected Radio Training prepares you to start your own Radio Service Shop—or to land a big pay Radio job. With my help you get neighborhood Radio jobs while learning—**for extra cash and rich experience.** I train you RIGHT by putting you to work with your hands in your own home during spare hours. You get 8 big kits of real professional Radio Parts and Equipment—and use them to build, test and trouble-shoot a powerful 6 tube superhet receiver, a 16 range test meter set-up and over 175 fascinating, instructive Radio experiments. My Training is down-to-earth, really PRACTICAL—it's the Training you need to make money in Radio. Theory is cut to the bone—you don't need any previous schooling or experience. Sprayberry Training starts you out at the very beginning of Radio—the lessons are completely illustrated, simply written and easy to understand. Get the facts about Sprayberry Training NOW. Find out what it can do for you—prepare for amazing opportunities in Radio Servicing, Television, FM, Radar and Industrial Electronics. Fill out and mail coupon for my two big Books—FREE. No obligation—and no salesman will call. Mail coupon TODAY!



Building this Signal Generator and multi-purpose Tester will give you the kind of valuable experience and practice that is so important as a foundation for making good money in Radio. It makes a breeze out of fixing Radios, and you don't have to spend money on ready-made Equipment.

VETERANS
Approved for G. I. Training Under Public Laws 16 and 346.

MAIL COUPON FOR THESE 2 BOOKS!

"How to Read Radio Diagrams and Symbols" and "How to Make Money in Radio, Electronics and Television." Immense, practical value to you — and they're yours FREE!

SPRAYBERRY ACADEMY OF RADIO
F. L. Sprayberry, President
5528 Sprayberry Bldg., Pueblo, Colo.

Please rush my FREE copies of "How to MAKE MONEY in RADIO, ELECTRONICS and TELEVISION" and "How to READ RADIO DIAGRAMS and SYMBOLS."

☐ Check here if a Veteran.

Name _____ Age _____

Address _____

City _____ State _____

(Mail in envelope or paste on penny postcard)

Copyrighted material

INVENTORS

Learn how to protect your invention. The U. S. Patent Laws provide that any new and useful art, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof, may be patented if the act of invention is involved. Therefore, every inventor with a valuable invention should take advantage of the Patent Laws and proceed for patent protection in order to safeguard his rights.

A patent gives the inventor the exclusive right to prevent others from making, using, or selling the invention claimed in the patent for a period of seventeen years.

The Patent Laws were enacted for the benefit of the inventor to give him protection for the features of his invention which are patentable. These features must be properly and concisely set forth and claimed in a formal application for patent, in order to comply with the requirements of the U. S. Patent Office. For that reason, the Patent Office advises the inventor, unless he is familiar with such matters, to engage a competent registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters.

A specially prepared booklet entitled "Patent Guide for the Inventor", containing detailed information with respect to patent protection and procedure, together with a "Record of Invention" form will be promptly forwarded to you without obligation upon request.

Registered Patent Attorneys

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON
Registered Patent Attorneys
82-B District National Bldg., Washington 5, D. C.

Please send me copy of "Patent Guide for the Inventor" and also "Record of Invention" form. This request does not obligate me.

Name_____

Address_____

City_____ State_____

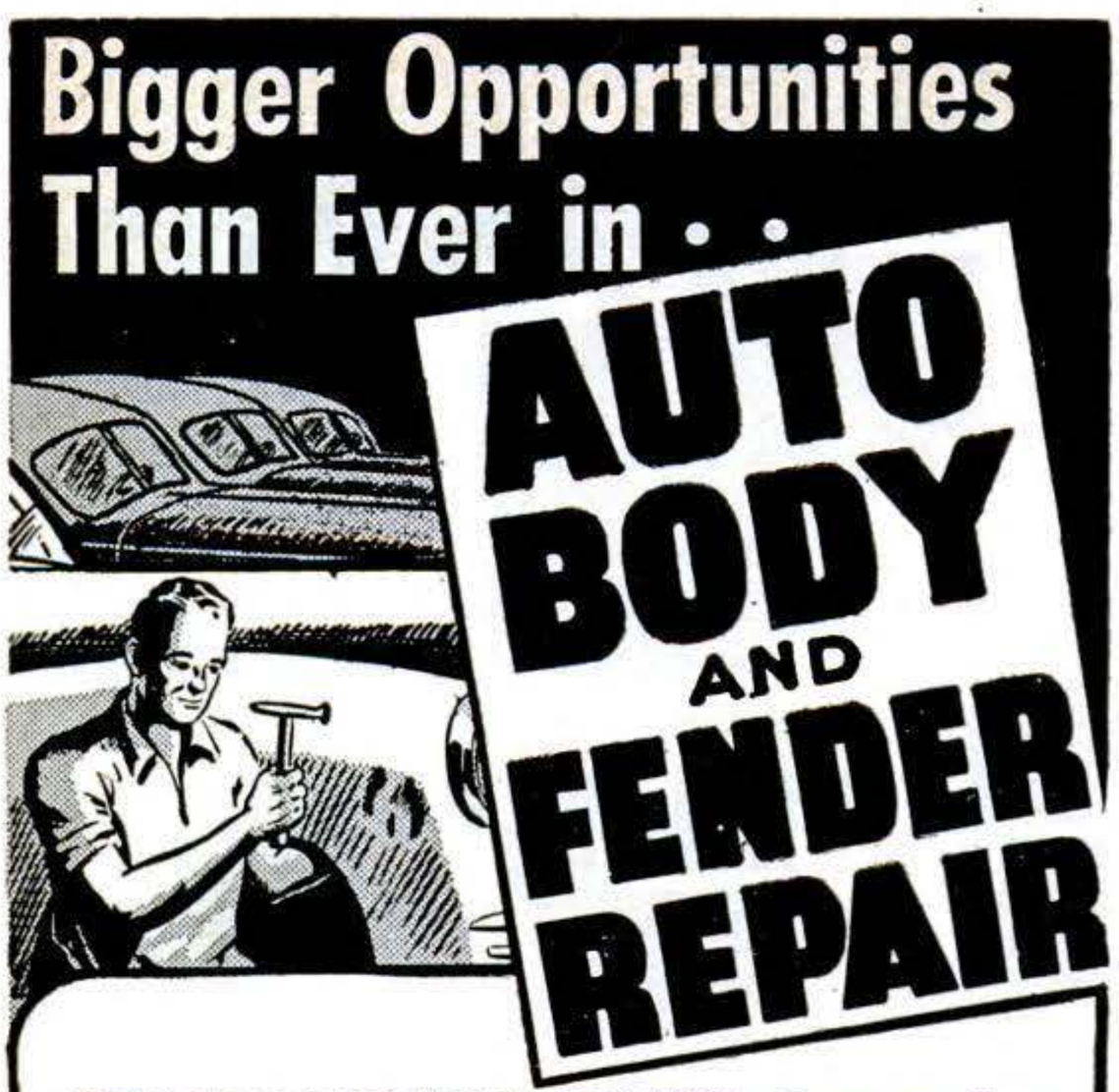
(Please write or print plainly.)

CLARENCE A. O'BRIEN & HARVEY B. JACOBSON

82-B District National Building + Washington 5, D. C.

Copyrighted material

Bigger Opportunities Than Ever in . .



●THE FIELD IS STILL GROWING after more than 40 years . . . expanding with the giant auto industry! Millions of new cars are getting to market, millions of old ones are still on the road—THE NEED for MAN-POWER in the service field is INCREASING!

TRAIN NOW . . . FOR THE OPPORTUNITIES AHEAD!

Don't be stuck in a low-pay job! Opportunity here is big enough for thousands to find big-pay work either in a reliable job or in their own shops. UEI teaches Auto Body & Fender Repairing the *easy* way. No special education or experience needed . . . you can start in your spare time, right at home . . . keep your job while you learn. Then, when home study is finished, you continue at the well-equipped UEI shops getting practical experience. Fix and refinish damage, replace panels and tops. Learn up-to-date methods in use of tools, spray painting, welding, metal work—all under expert supervision.

GET THE FACTS . . . FREE!

UEI HAS TRAINED THOUSANDS for opportunity fields, and students are making good. If you want to get ahead, send coupon today for free facts on AUTO BODY AND FENDER REPAIRING. Don't delay!

AUTOCRAFTS DIVISION
UTILITIES ENGINEERING INSTITUTE
2523 Sheffield Ave., Dept. 328-X
Chicago 14, Illinois

Approved for training under G. I. Bill

Founded 1927

FILL OUT AND MAIL · · TODAY!

Autocrafts Division
Utilities Engineering Institute, Dept. 328-X,
2523 Sheffield Ave., Chicago 14, Ill.
Yes, I'm interested! Send me those Free Facts about Auto Body and Fender Repairing.

NAME_____Age_____

ADDRESS_____

CITY_____Zone or County____STATE_____

☐ Check here for Special Information if under 17.

Letters

A Collector's Cover

Sir:

Congratulations on your scoop in publishing the first magazine cover sent by full-color radio facsimile. The cover and story reflect a high standard in journalism.

I would be interested in knowing if there is considerable interest in the cover as a collector's item in the United States.

ROBERT D. SMITH
Education Division
Institute of Inter-American Affairs
Lima, Peru

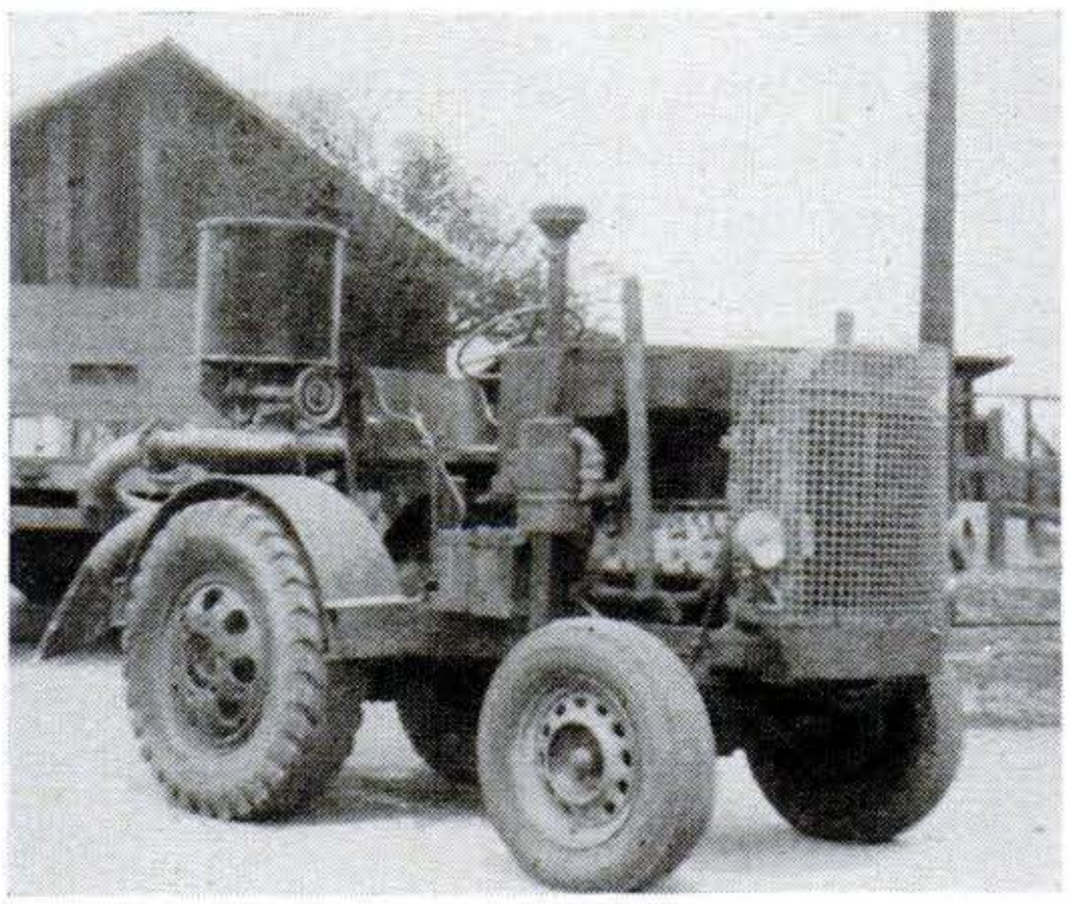
So far, interest has centered mainly around the process involved, but the cover (November) will undoubtedly have value as a collector's item to those interested in "firsts."

Everybody's Making 'Em!

Sir:

In your November issue on page 224, you had a picture of a homemade tractor. Here's a picture (below) of one I made.

It's got a V-8 truck motor, two four-speed truck transmissions, a 24-gallon gas tank, and a combined foot and hand clutch



so that it can be driven while walking along beside it. It has a 39-inch wheel tread, with power take-off for dusting.

We have used it two and a half years without a major breakdown. We use it to

Copyrighted material

INVENTORS

Patent Laws Encourage The Development of Inventions

The Rules of Practice of the U. S. Patent Office advise—unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent, as the value of patents depends largely upon the skillful preparation of the specifications and claims.

The firm of McMorrow, Berman and Davidson is registered to practice before the U. S. Patent Office. Additionally, it maintains a staff of attorneys able to readily understand inventors' disclosures, to advise concerning patentability, and to prepare appropriate specifications and claims for filing with the Patent Office.

If an inventor believes he has an invention, a search of the most pertinent prior U. S. patents should be made and a report obtained relative to its patentability. Where such report indicates that the invention appears patentable, in order to secure protection, diligence should be exercised in making application for a patent.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

142-D VICTOR BUILDING, WASHINGTON 1, D. C.

McMORROW, BERMAN & DAVIDSON

Registered Patent Attorneys

142-D Victor Building, Washington 1, D. C.

Send me further particulars as to patent protection and procedure and "Invention Record" form at once. I understand that this request does not obligate me.

Name_____

Address_____

City_____ State_____

(WRITE OR PRINT NAME CLEARLY)

Copyrighted material

Start as high as $3,021
A YEAR

(Veterans Get Special Preference)

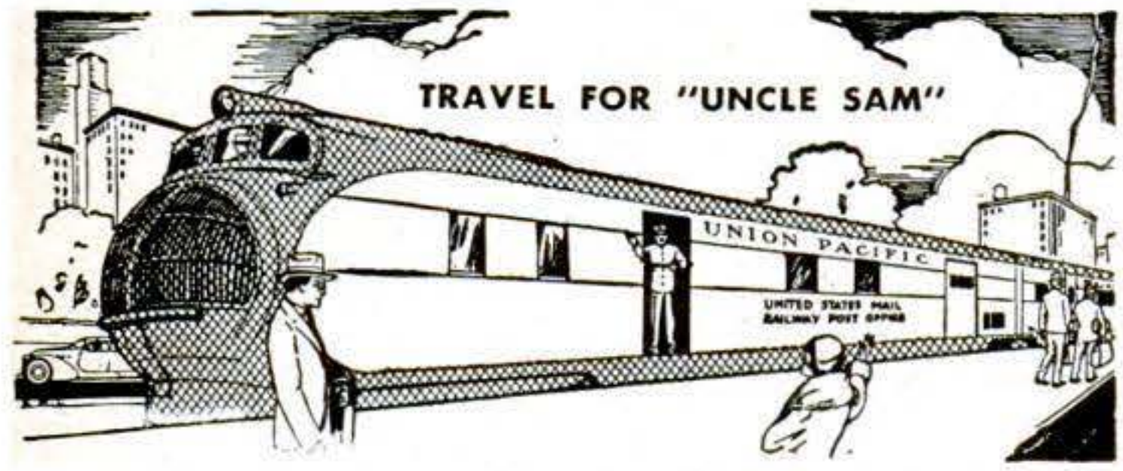
Get Ready Now for Next Examinations

Railway Postal Clerks

Railway Postal Clerks get $2,300 the first year of regular employment, being paid on the first and fifteenth of each month. ($95.84 each pay day.) Their pay is automatically increased yearly to $3,400 and $3,600 in large organizations. Advance may be had to Chief Clerk at $5,400 a year. Veterans only.

3 Days On—3 Days Off—Full Pay

Railway Postal Clerks on long runs usually work 3 days and have 3 days off duty or in the same proportion. During this off duty their pay continues just as though they were working. They travel on a pass when on business. When they grow old, they are retired with a pension.



City Mail Carriers, Post Office Clerks

Clerks and Carriers now get $2,100 the first year of regular employment and automatically increase $100 a year to $3,100. Open to Men—Women 18 to 50.

Many Other Positions

Many other positions are obtainable. Rural Carriers—Stenographers—Typists—Patrol Inspectors—Assistant Statistical Clerks—etc. Those wishing these positions should qualify at once.

Get Free List of Positions

Fill out the following coupon. Tear it off and mail it today —NOW, at once.

This investment can result in your getting a big-paid government job.

FRANKLIN INSTITUTE, Dept. T81, Rochester 4, N. Y.

Rush to me, entirely free of charge (1) a full description of U. S. Government Jobs; (2) Free copy of illustrated 32-page book, "How to Get a U. S. Government Job" with (3) List of U. S. Government Jobs; (4) Tell me how to qualify for one of these jobs.

Name.....

Address.....Veteran?.....

Use This Coupon Before You Mislay It.
Write or Print Plainly.

haul fruit out of the vineyards and orchards, dusting, light cultivating, and seeding. It's so peppy that it ran wild with two drivers who didn't know how to stop it. It took me six months to make it in my spare time. It has such a low gear that with the throttle wide open it will hardly move. It has a high gear of around 35 m.p.h. It's mostly a welded job. Also, the battery is spring-cushioned. It has a double-frame, dual-exhaust, regular tractor air cleaner. It's a very close coupled unit, no drive shaft.

ASHOUN M. ANDRANIGIAN

Kingsburg, Calif.

How Big Is a Nail?

Sir:

On page 139 of the December number is a footnote on how they got the size of nails.

When nails were made by hand, the weight of iron in each nail was figured by the pennyweight of iron. There were 20 grains to the pennyweight, so a two-penny nail weighed 40 grains, and an eight-penny nail 160 grains. That was the standard. My grandfather told me—and he made them.

V. H. BAKER

Tampa, Fla.

This version and the ones PS published all have their adherents—of course Mr. Baker has his grandfather on his side. The pennyweight is usually considered 24 grains.

Atomic Electricity?

Sir:

Our city is about to decide whether or not to grant a 30-year franchise for electric power, and I am writing to you to get your opinion on atomic energy for power.

Do you think there is a chance of producing electric power within five or 10 years with atomic energy? If so, could it be produced much more cheaply than with the methods in use today?

B. R. KANE

The Allen-White Co., Inc.
DeLand, Fla.

It is too early to tell when atomic energy may start commercial production of electricity, but 10 years is probably optimistic. Even then, competition will exist at first only in regions remote from other sources of power. Also, since the cost of distribution often exceeds that of production, this is

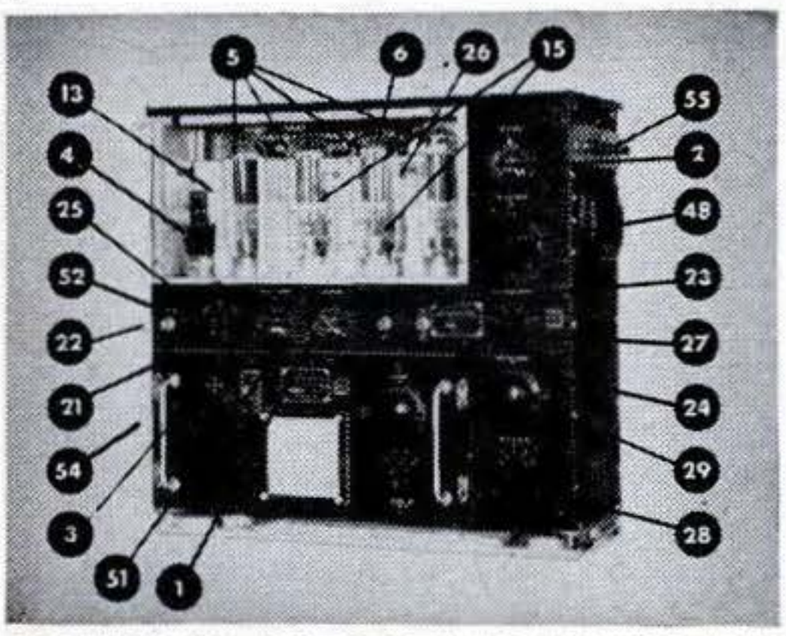
Copyrighted material

WAR SURPLUS BC-375-E TRANSMITTER

With thousands of usable standard radio parts

$24.50 COMPLETE
(Gov't cost, $1800)
Wiring & Conversion Diagram **FREE**

PARTS ALONE WORTH HUNDREDS OF DOLLARS TODAY! Use it for parts or use it as a transmitter



COMPLETE BC-375-E TRANSMITTER

You get all this: transmitter, tubes, ant. loading unit, dynamotor, five tuning units.

METERS
1. (1) 0-15V AC DC., GE
2. (1) 0-8A RF with thermocouple, GE
3. (1) 0-500 MA. DC., GE

TUBES
4. (1) 10Y (VT-25)
5. (4) 211 (VT-4-C)

COILS
44. (3) RF chokes
45. (1) AF choke .5 hy .1 amp
46. (1) Parasitic Suppressor
47. (1) Tapped antenna loading coil on ceramic form

COILS *(continued)*
48. (1) Continuously variable antenna loading coil with dial-ceramic form

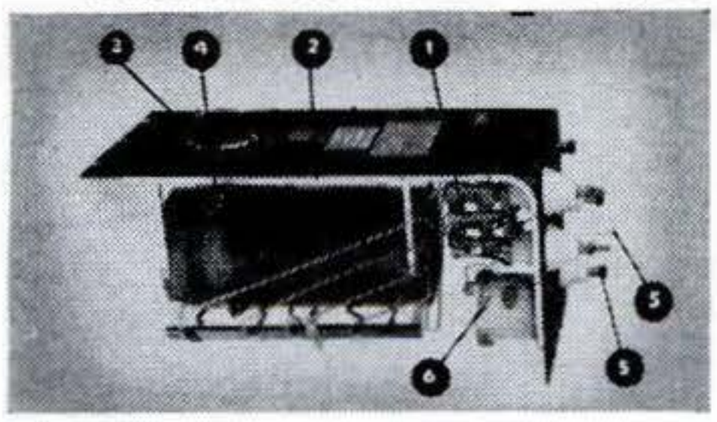
SWITCHES
21. (1) Interlock
22. (1) Test
23. (1) SPDT Toggle
24. (2) DPST Toggle
25. (1) 3 pos. Mallory w/bar knob
26. (1) SPDT Toggle
27. (1) 4 pos., 3 sec. hi voltage band switch w/bar knob
28. (1) 5 pos. hi voltage, band switch w/bar knob

RESISTORS
6. (1) Tapped Resistor 2.7 ohms, 36 watts—3.7 ohms, 26 watts
7. (1) 5 ohms 2 watt, IRC
8. (2) 5 ohms 12 watt, IRC
9. (1) 50 ohms 4 watt, IRC
10. (1) 100 ohms 12 watt, IRC
11. (1) 150 ohms 8 watt, IRC
12. (1) 200 ohms 2 watt, IRC
13. (1) 200 ohms variable, Mallory
14. (1) 2500 ohms 15 watt, IRC
15. (2) 3000 ohms variable, Mallory
16. (1) 4000 ohms 15 watt, IRC
17. (3) 11000 ohms 12 watt, IRC
18. (1) 30000 ohms 1 watt, IRC
19. (1) 200000 ohms 1 watt, IRC
20. (4) 250000 ohms 1 watt, IRC

CAPACITORS
29. (1) 22-118 mmf. variable with vernier dial
30. (1) tube thermal compensating and calibration reset capacitor
31. (2) .0001-1000 V, CD, mica
32. (1) .006-2500V, CD, mica
33. (2) .001-2500V, CD, mica
34. (1) .001-4500V, CD, mica
35. (1) .02-1000V, CD, mica
36. (1) .01-1000V, CD, mica
37. (1) .01-2500V CD, mica
38. (3) 1-300V, CD, mica
39. (1) 1-1-1 3000V GE, pyranol
40. (1) 25 mfd 25V, CD, electrolytic

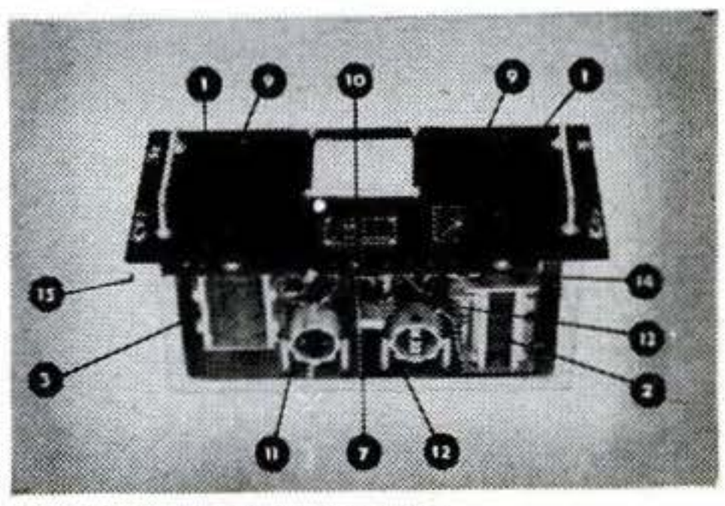
TRANSFORMERS
41. (1) Microphone trans. single button mic. to single grid
42. (1) Interstage transformer single plate to push-pull grids.
43. (1) Modulation transformer — class B mod. to class C plate

MISCELLANEOUS
49. (1) 8 contact antenna relay—28V D.C.
50. (2) Ceramic insulated flexible couplings
51. (1) 6.3V dial lamp and socket
52. (1) mic. jack
53. (2) .5A-1000V Fuses
54. (3) Sockets with plugs
55. (5) Binding posts
Plus hardware, stand-off insulators, etc.



BC-306-A ANTENNA LOADING UNIT
1. (1) 3 Gang, 5 position, high voltage band switch
2. (1) Tapped inductance with variometer tuning
3. (1) Vernier dial
4. (1) Ceramic insulated flexible coupling
5. (2) Bee-hive feed-thru insulators
6. (1) Capacitor .00024-6000V SANGAMO

SAVE C. O. D. CHARGES by remitting in full direct—or send 25% deposit with all orders. Shipment made direct from whse. in Okla., Ariz., Ark. or Virginia.



TYPICAL TUNING UNIT
TU-5-B—1500-3000 KCS
1. (2) Vernier dials
2. (1) Variable capacitor, 20-135 mmf.
3. (1) Variable capacitor, 20-156 mmf.
4. (1) Variable capacitor, 8-26 mmf.—neutralizing
5. (1) .00003-2000V capacitor, CD—mica
6. (3) .00009-3000V capacitor, CD—mica
7. (2) .0004-5000V capacitor, CD—mica
8. (3) .0001-3000V capacitor, CD—mica
9. (2) 4 position ceramic band switches
10. (2) 2 RF chokes
11. (1) Tank coil—ceramic form with tapped antenna coupling coil
12. (1) Tank coil—ceramic form
13. (1) Parasitic suppressor
14. (2) Ceramic flexible couplings
15. Plus banana jacks, stand-off insulators

PE-73 DYNAMOTOR
1. (1) Dynamotor 28V DC input—1000V DC output—GE
2. (1) Fuse, 30A 250V
3. (1) Fuse, 60A 250V
4. (1) Fuse, 1A 1000V
5. (1) Relay, 24V D. C.
6. (3) .005-5000V Capacitor, mica—CD
7. (1) .01-1000V Capacitor, mica—CD
8. (2) .01-600V Capacitor, mica—CD

R & M RADIO COMPANY

Dept. S-28—1425 N. QUINCY ST., ARLINGTON, VIRGINIA

Copyrighted material

Learn MECHANICAL ENGINEERING & INDUSTRIAL DESIGN in 2 years

A NEW WORLD OF OPPORTUNITY FOR YOU

..in designing and engineering new and improved products .. in the creation of new product ideas. all are demanded in ever-mounting numbers by industry, business and the public. Make this YOUR world...through training in Mechanical Engineering and Industrial Design, the old established field now offering new and broader opportunities than ever before. Make your imagination and skill bring you rich rewards. Equip yourself with broad, modern training that emphasizes Design. Be the type of trained man needed throughout all industry.

TRAIN AT NORTHROP

at the birthplace of famous aircraft where design, engineering, and aircraft history is being written Here the Institute now offers—in addition to Aeronautical Engineering—an intensive 2-year course in Mechanical Engineering and Industrial Design Proven, practical training methods bring you a thorough mastery of engineering techniques, plus abundant practice in actual Product Design For complete information, send coupon

NORTHROP
Technical and Aeronautical
INSTITUTE
Division of Northrop Aircraft, Inc.
1525 East Broadway
Hawthorne, Los Angeles County
California

APPROVED FOR VETERANS

Please send me the Institute catalog and complete information, including starting dates of classes. I am interested in

☐ Mechanical Engineering ☐ Aeronautical Engineering
☐ Aircraft and Aircraft Engine Mechanics (A&E)

Name

Address Age

City Zone State

Check one: ☐ Veteran ☐ In Service ☐ Civilian

S-2

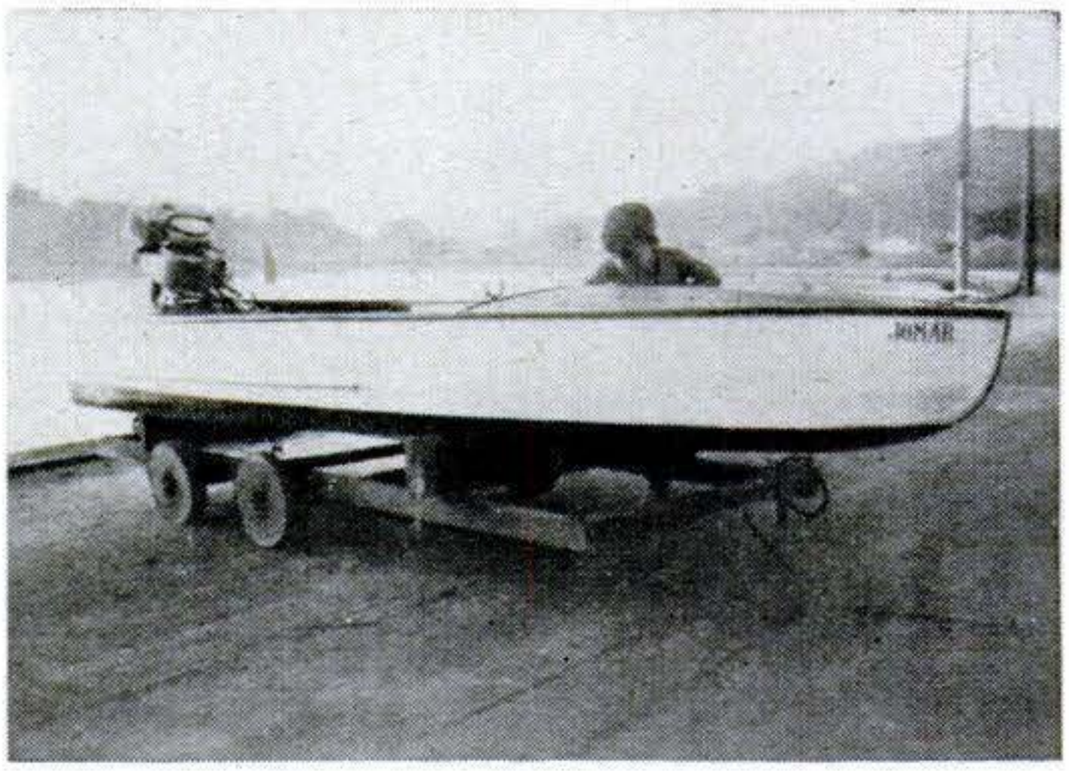
only part of the problem. Geographical location, consumer demand, and population density will have to be weighed when the time comes to consider the value of atomic-produced electricity to any one town or city.

Plans that Paid Off

Sir:

I am sending you a photograph (below) of the boat I built from the plans published in your 1938 July and August issues. I had never built a boat before but was able to because of your complete instructions.

The planks are of red cedar and the frames of a Brazilian hard wood named



peroba do camp. It is seaworthy and planes very well. With my motor of eight horsepower, it speeds up to about 25 m.p.h. . . .

OSCAR B. BEZERRA

Rio de Janeiro

That Coin Again!

Sir:

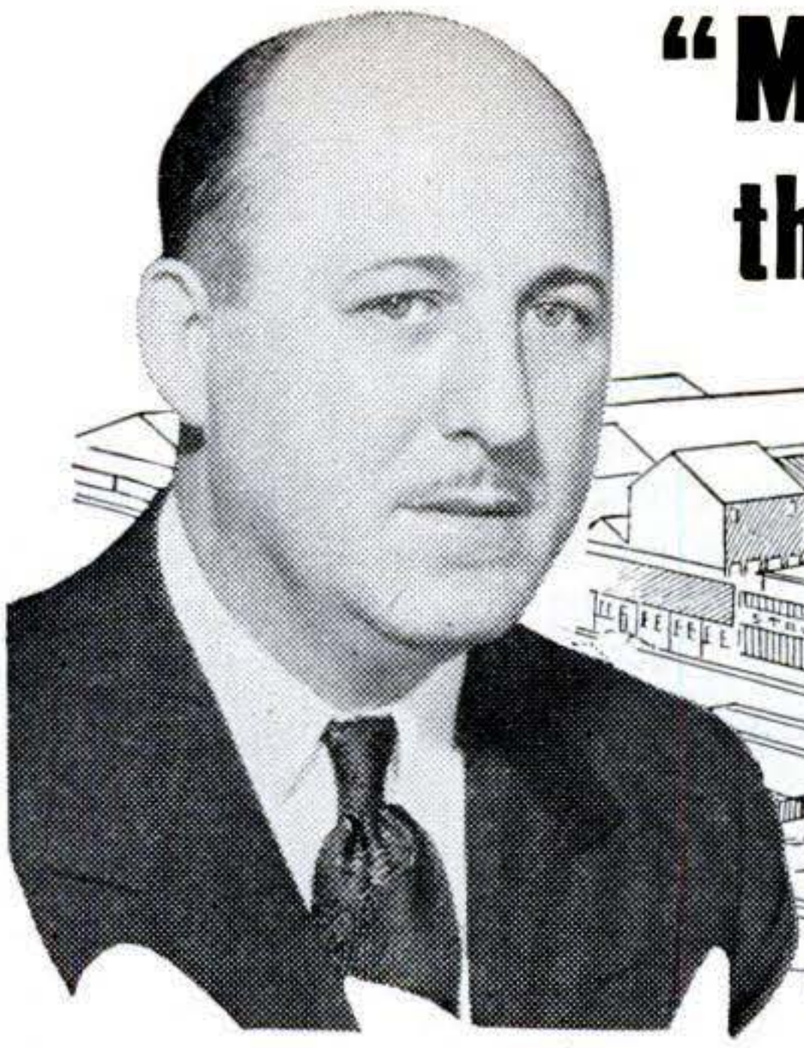
Not to split hairs, but to illustrate how ambiguous and unscientific language can be . . . I quote your concluding syllogistic explanation of the "Heads Up" coin problem (Nov. '47, p. 16): "Two halves make a whole."

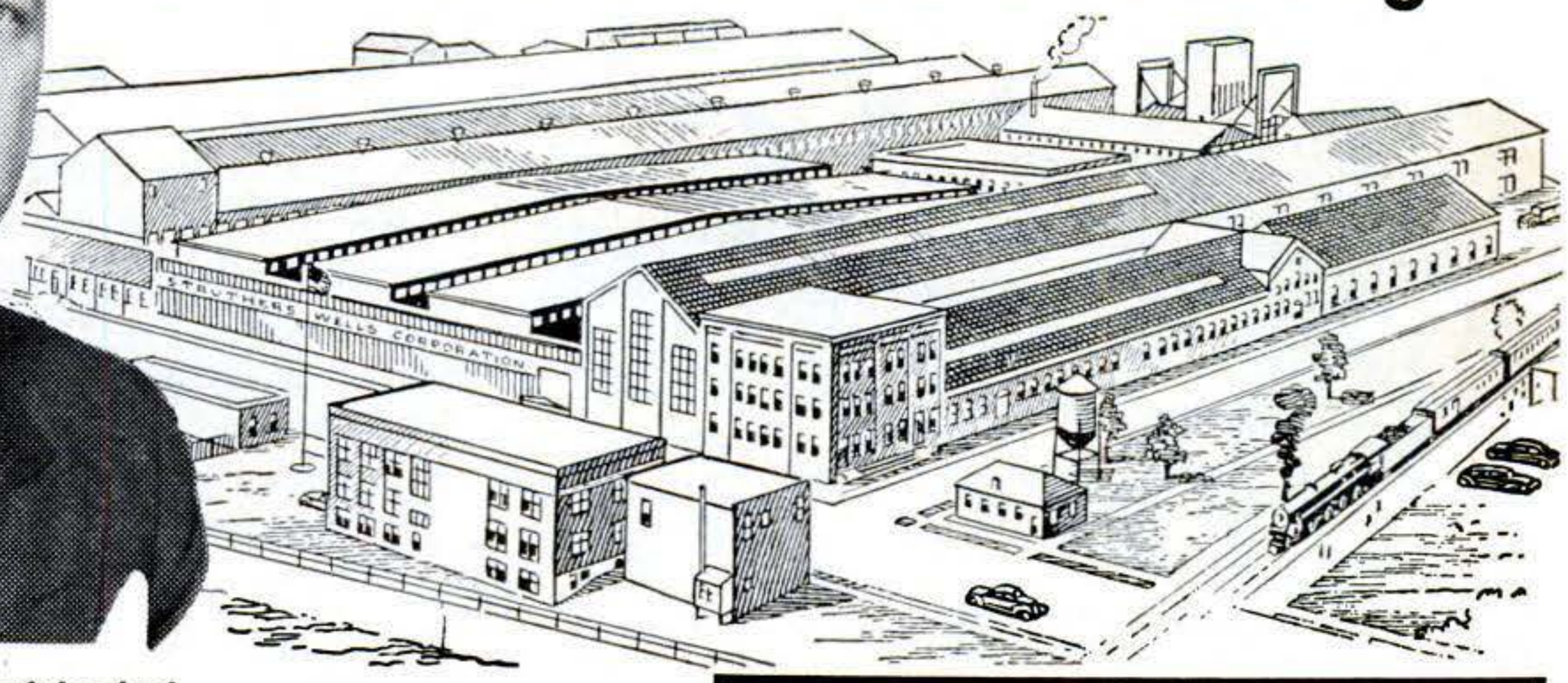
Now, two halves do not make a whole if one half happens to be that of a peach and the other that of a pear. Similarly, one half of a "revolution" plus one half of a "roll" do not make either a whole revolution or a whole roll. Furthermore, the "heads up" position of the revolving coin merely reveals that this coin, which originally faced away from the stationary coin, now faces toward it; and this, in turn, proves that the coin has merely made one half of a "roll". . . .

Let's imagine the coins to be replaced by

Copyrighted material

"Many of our key men owe their success to I.C.S. training"





C. W. JENSEN, ***General Superintendent***
Struthers Wells Corp.

The Struthers Wells Corporation makes custom-built industrial equipment—specializes in precision and accuracy. The skill and training of the Struthers Wells engineers, designers, craftsmen are reflected in the quality of the work they turn out. It's significant that a high percentage of these men received their training through International Correspondence Schools. Their records of success prove the worth of this sound, practical training.

The same opportunity is open to you. If you have ambition, foresight, normal intelligence—I. C. S. can help you get ahead. The first step is to mail the coupon below. Do it now!

"We have five engineering departments and the heads of four of them are I.C.S. men.

"I.C.S. has trained 33 per cent of our engineers and draftsmen.

"85 per cent of our shop supervisors have studied I. C. S. courses.

"12 per cent of all employees in this plant are I.C.S. students or graduates."

INTERNATIONAL CORRESPONDENCE SCHOOLS

ICS

BOX 7602-M, SCRANTON 9, PENNA.

Without cost or obligation, please send me full particulars about the course BEFORE which I have marked X:

Air Conditioning and Plumbing Courses
- ☐ Air Conditioning
- ☐ Heating
- ☐ Plumbing
- ☐ Refrigeration
- ☐ Steam Fitting

Chemistry Courses
- ☐ Chemical Engineering
- ☐ Chemistry, Analytical
- ☐ Chemistry, Industrial
- ☐ Chemistry, Mfg. Iron & Steel
- ☐ Petroleum Refining
- ☐ Plastics
- ☐ Pulp and Paper Making

Civil Engineering, Architectural and Mining Courses
- ☐ Architecture
- ☐ Architectural Drafting
- ☐ Bridge and Building Foreman
- ☐ Building Estimating
- ☐ Civil Engineering
- ☐ Coal Mining
- ☐ Contracting and Building
- ☐ Highway Engineering
- ☐ Lumber Dealer
- ☐ Reading Structural Blueprints
- ☐ Sanitary Engineering
- ☐ Structural Drafting
- ☐ Structural Engineering
- ☐ Surveying and Mapping

Communications Courses
- ☐ Electronics
- ☐ Practical Telephony
- ☐ Radio, General
- ☐ Radio Operating
- ☐ Radio Servicing
- ☐ Telegraph Engineering

Electrical Courses
- ☐ Electrical Drafting
- ☐ Electrical Engineering
- ☐ Electric Light and Power
- ☐ Lighting Technician
- ☐ Practical Electrician

Internal Combustion Engines Courses
- ☐ Auto Technician
- ☐ Aviation
- ☐ Diesel-Electric
- ☐ Diesel Engines
- ☐ Gas Engines

Mechanical Courses
- ☐ Aeronautical Engineer's, Jr.
- ☐ Aircraft Drafting
- ☐ Flight Engineer
- ☐ Forging
- ☐ Foundry Work
- ☐ Heat Treatment of Metals
- ☐ Industrial Engineering
- ☐ Industrial Metallurgy
- ☐ Machine Shop
- ☐ Mechanical Drafting
- ☐ Mechanical Engineering
- ☐ Mold-Loft Work
- ☐ Patternmaking—Wood, Metal
- ☐ Reading Shop Blueprints
- ☐ Sheet-Metal Drafting
- ☐ Sheet-Metal Worker
- ☐ Ship Drafting
- ☐ Ship Fitting
- ☐ Tool Designing
- ☐ Toolmaking
- ☐ Welding—Gas and Electric

Railroad Courses
- ☐ Air Brake
- ☐ Car Inspector
- ☐ Diesel Locomotive
- ☐ Locomotive Engineer
- ☐ Locomotive Fireman
- ☐ Railroad Section Foreman

Steam Engineering Courses
- ☐ Boilermaking
- ☐ Combustion Engineering
- ☐ Engine Running
- ☐ Marine Engineering
- ☐ Steam Electric
- ☐ Steam Engines

Textile Courses
- ☐ Cotton Manufacturing
- ☐ Rayon Weaving
- ☐ Textile Designing
- ☐ Woolen Manufacturing

Business and Academic Courses
- ☐ Accounting
- ☐ Advertising
- ☐ Arithmetic
- ☐ Bookkeeping
- ☐ Business Administration
- ☐ Business Correspondence
- ☐ Certified Public Accounting
- ☐ Commercial
- ☐ Commercial Art
- ☐ Cost Accounting
- ☐ Federal Tax
- ☐ First Year College
- ☐ Foremanship
- ☐ French
- ☐ Good English
- ☐ High School
- ☐ Higher Mathematics
- ☐ Motor Traffic
- ☐ Postal Service
- ☐ Salesmanship
- ☐ Secretarial
- ☐ Sign Lettering
- ☐ Spanish
- ☐ Stenography
- ☐ Traffic Management

Name_____ Home Address_____

City_____ State_____

Age_____ Present Position_____ Working Hours_____ A.M. to_____ P.M.

Special tuition rates to members of the Armed Forces. Special discount to World War II Veterans.
Canadian residents send coupon to International Correspondence Schools Canadian, Ltd., Montreal, Canada.

Copyrighted material

Less than 50¢ A week buys as much as $1746. of Old Line Legal Reserve LIFE INSURANCE

YOU ACTUALLY PAY only *$2.00 a month at all ages for the amounts shown below.
*THIS IS HALF THE PERMANENT RATE WHICH TAKES EFFECT THE 6TH YEAR.

AT AGE	FOR MONTHLY PREMIUM OF	YOU GET A POLICY FOR
20	$2.00	$1746.
25	2.00	1582.
30	2.00	1408.
35	2.00	1250.
40	2.00	1086.

Proportionate amounts at all other ages, 15-55. Mail coupon now for full facts and amounts at your age.

Here is a unique plan that lets you budget your Life Insurance like rent. The rate is the same no matter what your age! The amounts vary but, even at 40 you can get $1086 of this Solid, Old Line, Legal Reserve Life Insurance protection!
And not only that—but your policy will be

FULLY PAID-UP IN 30 YEARS

with no more premiums to pay, yet your insurance continues in force the rest of your life.

POSTAL LIFE operating under the rigid New York State Insurance laws has sold Life Insurance by mail and over the counter for 43 years and has satified policyholders everywhere. Over $14,000,000 in assets! More than $60,000,000 paid out in benefits!

Postal Policies are participating! Mail Coupon today!

Get the FACTS by mail!

Postal Life Insurance Company
511 Fifth Avenue, Dept. D-763
New York 17, N. Y.
Mail me complete information about your new "$2.00-per-month", 30-payment Modified 5 Whole Life Policy at my age.

NAME .....
OCCUPATION .....
DATE OF BIRTH .....
ADDRESS .....
Include Postal Zone, if any.

meshed spur gears, each four inches in diameter. Thus each gear would have a circumference of 12 inches. Then when the traveling gear reached the position of the question mark, it would have used six of its own teeth, but it would also have used six teeth of the stationary gear. Then 12 teeth would represent the full circumference of one of the gears, and the latter would necessarily have made one revolution.

Like Olin Miller's saying: "I'll think it over and let you know"—thus using eight words to say "no"—I think you'll agree that my explanation is—wordy.

JOE BLONDIN

Sacramento, Calif.

That clear it all up, folks?

132,000 Volts Can't Be Wrong

Sir:

I have an inquiry regarding the article on page 147 of the September issue referring to a 52-ton transformer. I have never heard of 132,000 volts A.C. The highest I have known being supplied to an individual company's transformers was 13,200 volts—or 13-2 as we electricians call it.

I am interested in knowing what company supplies such high voltage. . . .

LESTER WM. SCHLODER

Philadelphia, Pa.

Believe it or not, the Marietta Electric Co. supplies the 132,000-volt alternating current. The similarity between this voltage and the lower, more familiar 13-2 is just one of those coincidences.

Pop-Ups Pop Up Again

Sir:

Several of our Chilean readers have noticed the article entitled "Houses Pop Up When Cradle Rocks" on page 115 of the April issue. They are interested in securing further information on the cost, construction, and erection of such houses. . . .

(MRS.) VIVA DREW HALL

Instituto Chileno NorteAmericano de Cultura
Santiago, Chile

PS welcomes interest from its South American neighbor and is passing Mrs. Hall's request along to the originators of the method.

Copyrighted material

Learn RADIO

in a Few Weeks

In the GREAT SHOPS of COYNE

NOT A "HOME-STUDY" COURSE!

B. W. Cooke

Men, here's the quick, easy way to learn Radio—with practical training in the Great Shops of COYNE. All training given on full-size equipment under friendly, helpful instructors, plus necessary theory. We do not teach by mail. At **Coyne** you learn Radio Set-building and Trouble-shooting, Public Address and Sound Systems, Television, Electronics, how to start your own shop. Prepare NOW for better jobs, bigger pay. Mail coupon today!

ATTENTION, NON-VETERANS!

Don't let lack of money hold you back. Our Student Finance Plan has helped thousands. Pay most of tuition after you graduate. We also help you get part-time work while here, if you wish. Lifetime Job Service FREE to **Coyne**-trained men.

INCLUDED!

Added training in Electric Refrigeration Now Included with Radio Course.

VETERANS!

COYNE is authorized to train men who qualify under the G. I. Bill. Coupon brings special G. I. Bulletin.

SEND NOW FOR BIG FREE BOOK

Dozens of actual photos taken in the Great Shops of **Coyne**—also vital facts about YOUR opportunities in Radio-Electronics and Television. **Coyne** gives you ALL-AROUND Training, to prepare for many branches of the vast Radio field. Send for this book today. No obligation, and no salesman will call on you. Rush the coupon—new class starting soon!

Founded 1899

B. W. COOKE, President, Radio Division

COYNE ELECTRICAL SCHOOL

500 S. PAULINA ST. Dept. 28-4H CHICAGO 12

FREE BOOK COUPON

B. W. COOKE, President
COYNE ELECTRICAL SCHOOL, Radio Division
500 S. Paulina St., Dept. 28-4H, Chicago 12, Ill.

I want to build a REAL FUTURE for myself. Send your big FREE BOOK on RADIO, also details of Student Finance Plan and Lifetime Employment Service. This does not obligate me in any way, and no salesman will call.

NAME.....

ADDRESS.....

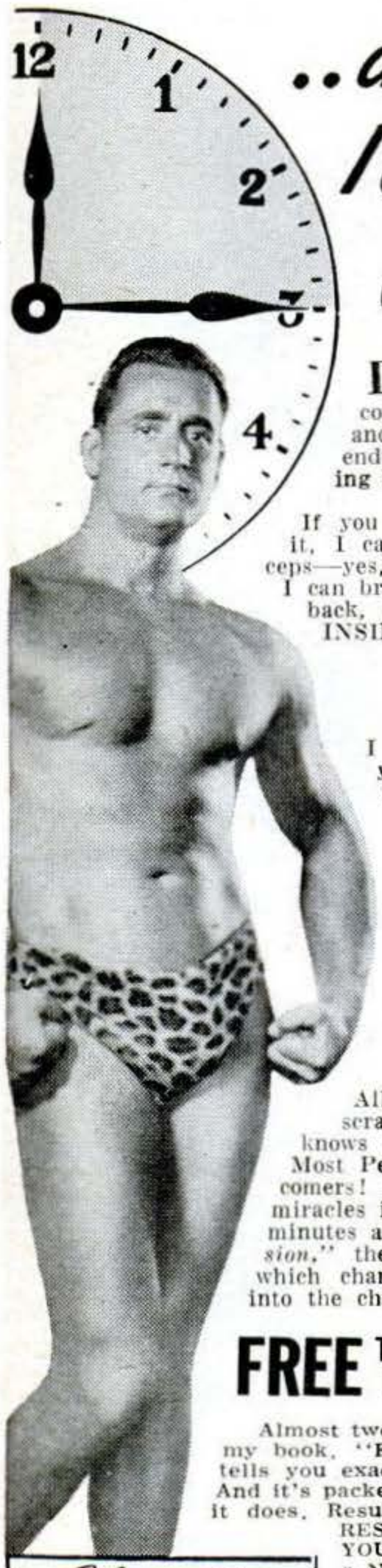
CITY.....STATE.....

...MAIL THIS TODAY!

Copyrighted material

Lend Me 15 Minutes A Day

..and I'll prove I can make you a NEW MAN



I'M trading in old bodies for new! I'm taking men who know that the condition of their arms, shoulders, chests and legs—their strength, "wind," and endurance—is not 100%. And I'm making **NEW MEN** of them!

If you can simply raise your arm and flex it, I can add **SOLID MUSCLE** to your biceps—yes, on each arm—in double-quick time! I can broaden your shoulders, strengthen your back, develop your whole muscular system INSIDE and OUTSIDE!

What Only 15 Minutes a Day Can Do

I can add inches to your chest, give you a vise-like grip, make those legs of yours lithe and powerful. I can shoot new strength into your old backbone, exercise those inner organs, help you cram your body so full of pep, vigor and red-blooded vitality that you won't feel there's even "standing room" left for weakness and that lazy feeling! Before I get through with you I'll have your whole frame measured" to a nice, new, beautiful suit of muscle!

I Was a 97-lb Weakling

All the world knows I was ONCE skinny, scrawny 97-pound weakling. And NOW it knows that I won the title, "The World's Most Perfectly Developed Man." Against all comers! How did I do it? How do I work miracles in the bodies of other men in only 15 minutes a day? The answer is *"Dynamic Tension,"* the amazing method I discovered and which changed me from a 97-pound weakling into the champion you see here!

FREE THIS FAMOUS BOOK "EVERLASTING HEALTH AND STRENGTH"

Almost two million men have sent for and read my book, "Everlasting Health and Strength." It tells you exactly what *"Dynamic Tension"* can do. And it's packed with pictures that SHOW you what it does. Results it has produced for other men. RESULTS I want to prove it can get for YOU! Learn how you can actually become a NEW MAN, right in the privacy of your own home and in only 15 minutes a day! Mail this coupon NOW! CHARLES ATLAS, Dept. 1-B, 115 East 23rd St., New York 10, N. Y.

Charles Atlas

Actual photo of the man who holds the title, "The World's Most Perfectly Developed Man."

CHARLES ATLAS, Dept. 1-B,
115 East 23rd St., New York 10, N. Y.

I want the proof that your system of *"Dynamic Tension"* will help make a New Man of me—give me a healthy, husky body and big muscular development. Send me your free book, "Everlasting Health and Strength.

Name.....Age.....
(Please Print or Write Plainly)

Address.....

City.....State.....

TURN YOUR LONGHAND INTO

SHORTHAND IN 6 WEEKS AT HOME

WRITE 120 WORDS PER MINUTE

Easy for Adults

Famous Speedwriting system. No signs or symbols. No machines. Uses ABC's. Easy even for adults to learn and use. Fast preparation for a position and a sound, substantial future. Nationally used in leading offices and Civil Service; also by executives, writers, speakers, lawyers, scientists, students at college. Over 100,000 taught by mail. Also typing.

The very low cost will surprise you

25TH YEAR

Write for Free Booklet to

LEARNS SPEEDWRITING IN 40 HOURS OF STUDY!

"Because I didn't know shorthand, I had to do clerical work. One evening I saw a Speedwriting advertisement and later enrolled. Speedwriting was as easy to learn as the advertisement claimed. I learned Speedwriting in 40 hours of study. It was with a feeling of confidence I was able to go out and secure a new job that meant more money and better opportunities."—Miss Ruth E. Rubinow, Norwalk, Conn.

Speedwriting (Trade Mark Reg. U. S. Pat. Off.) ®

Dept. 2602-8, 55 West 42nd Street, N. Y. 18

MAKE MONEY CASTING AT HOME

.. FREE FACTS SENT ..

X.L. RUBBER MOLDS

Make your own rubber molds Cheaply. Cast thousands, of perfect Book Ends, Ash Trays, Etc., from every mold. **Enormous Profits.** Start Small. **GROW BIG.** X. L. RUBBER, Pts. $2.00; Qts. $3.50; Gallons $8.95. Models & enough rubber for 3 molds $1.00. Foreign $1.50.

PLASTIC ARTS STUDIO, Rt. No. 2, Dept. 65, MUNCIE, INDIANA.

Learn LANDSCAPE GARDENING

A thorough, interesting constructive home training, covering your regional conditions, for those who wish to become LANDSCAPERS, DESIGNERS, GARDENERS, etc., for profit or pleasure. Write today for FREE INFORMATION without obligation.

Approved for Veterans—in all States

NATIONAL LANDSCAPE INSTITUTE

Dept. PS-2, 310 So. Robertson, Los Angeles 36, Cal.

LEARN MONEY-MAKING CARTOONING

IN SPARE TIME — by Easy Picture Chart Method

Same Simplified Method that has helped train creators of "Terry & Pirates," "Freckles," "Out Our Way," "Winnie Winkle," "Reg'lar Fellers," "Strange As It Seems," "The Neighbors," and many others. Earn while learning. Send 10c for Picture Chart (to test your ability). Samples of successful students, and full details. (State age.)

The Landon School, 4822 Cleveland Transit Bldg., Cleveland, O.

LEARN TO WRITE

The Magazine Institute, a private school owned, operated, and staffed by successful writers and editors, offers an up-to-the-minute course in writing for magazines, which makes it easy for beginners to get started in this rich field. You work in spare time at home. You may concentrate on either fiction or non-fiction. Send today for the FREE CATALOG describing the Magazine Institute method. VETERANS: THIS COURSE APPROVED FOR VETERANS' TRAINING.

The Magazine Institute, Inc.
Dept. 462, 50 Rockefeller Plaza,
Rockefeller Center, New York 20, N. Y.

Please send free catalog, without obligation, to:

Name.....

Address.....

.....

☐ Check here if eligible under G. I. Bill
(Inquiries confidential. No salesman will call)

Copyrighted material

PATENT PROTECTION *for* INVENTORS

A PATENT IS A VALUABLE RIGHT

On the basis of a provision in the Constitution of the United States, Congress has established a system under which inventors may secure the exclusive right to prevent the unauthorized use, manufacture and sale of their inventions for periods of seventeen years. The inventor secures this protection by obtaining a patent from the United States Patent Office.

Victor J. Evans & Co. . . has a staff of experienced registered patent attorneys, available to assist inventors in the preparation and prosecution of their cases before the Patent Office. Detailed information and the steps to be taken in obtaining patent protection will be furnished upon request.

FORM BELOW FOR MAILING CONVENIENCE

VICTOR J. EVANS & CO.

Merlin M. Evans
REGISTERED PATENT ATTORNEY
340-B Merlin Building, Washington 6, D. C.

Please forward to me detailed information regarding procedure to obtain Patent Protection, together with your convenient "Evidence of Invention" form.

Name.....

Address.....

City and State.....

PATENTS • • • • TRADEMARKS • • • • COPYRIGHTS

Copyrighted material

When your chance comes to step into a better job— WILL YOU BE PREPARED?

These are times of change in business . . . Jobs must be filled quickly—**with able men.** These six volumes give you the practical knowledge that promotes executive efficiency —prepares you for a better job.

They cover methods of management most needed in the executive approach to business. Use them for immediate help on your present business problems — and to get the "know-how" for the bigger jobs ahead.

LIBRARY OF BUSINESS MANAGEMENT

6 volumes, 1973 pages

1. **BUSINESS ORGANIZATION:** How to organize a department or business . . . plan and control its workings . . . provide personnel. 2. **BUSINESS FINANCE:** Where and how to get money—the life-blood of business. 3. **CREDIT AND COLLECTIONS:** How to reduce credit losses . . . how to modernize your credit system . . . establish credit policy. 4. **EFFECTIVE MARKETING:** How to improve sales methods . . . develop promotions. 5. **BUSINESS CORRESPONDENCE:** How to write effective letters . . . save time and money with better methods. 6. **MANAGING YOURSELF:** How to conserve and direct your energies . . . how to handle detailed problems.

FREE TRIAL—EASY TERMS

McGraw-Hill Book Co., Inc., 330 W. 42d St., NYC 18

Send me the McGraw-Hill Library of Business Management, 6 volumes, for 10 days' examination on approval. In 10 days I will send $2.50 and then $3.00 monthly until $17.50 is paid, or return the books postpaid.

Name.....

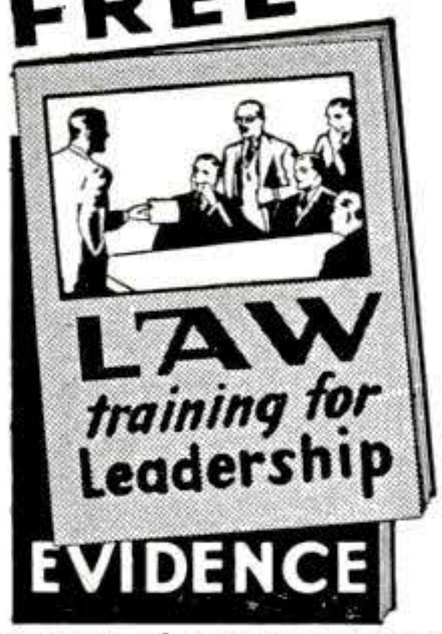
Address.....

City and State.....

Company..... Position.....PSM-2-48

For Canadian price, write McGraw-Hill Co. of Canada Ltd., 12 Richmond Street E., Toronto 1

FREE TO the MAN INTERESTED IN LAW



Every question about Law and its value to you is answered in LaSalle's 48-page booklet, "Law Training for Leadership." And the question of *how* you can master Law is answered in the companion booklet, "Evidence"—in which scores of our students tell how they have advanced through LaSalle Law Training in spare hours at home.

Legal training gives you what the business and professional world prizes highly and rewards liberally —a keen, analytical mind, the ability to judge shrewdly, talk convincingly, and act with confidence.

LaSalle's "Problem Method" of personalized instruction by lawyer-instructors gives you practice in handling legal problems . . . you *learn by doing*, not by memorizing rules. We guide you step-by-step, furnish all texts, including remarkable 14-volume Law Library prepared by leading law professors and lawyers, and used as reference in many Law libraries and offices. Degree of LL.B. conferred. Low cost, easy terms.

Investigate *your* opportunities in Law. Mail coupon today for free booklets described—without obligation.

LA SALLE EXTENSION UNIVERSITY
A Correspondence Institution
417 S. Dearborn St. Dept. 283-L Chicago 5, Ill.

Send me "Law Training for Leadership" and "Evidence"—without obligation.

Name.....*Age*.....

Street.....

City, Zone & State.....

CAUGHT BY THEIR FINGER PRINTS

Can Train for CRIMINAL INVESTIGATION and IDENTIFICATION WORK AT HOME!

During the past 30 years the I. A. S. has trained hundreds of men at home to fill positions of responsibility and steady pay as finger print experts. This fascinating, profitable profession can be learned at home during spare time. More than 800 *American Identification Bureaus* employ I. A. S. graduates or students. Write today for complete list of these Bureaus.

Send Now for "BLUE BOOK of CRIME"
Thrilling, inspiring, helpful. Be sure to state your age when sending for book. **FREE!**

INSTITUTE OF APPLIED SCIENCE
Dept. 1362, 1920 Sunnyside Ave., Chicago 40, Ill.

LEARN TO WRITE a Good Hand!

FOR BUSINESS AND SOCIAL SUCCESS!

Improve your handwriting at home quickly with my new instruction books just off the press. Master all the secrets of better penmanship. Simple and easy, fully illustrated, highly endorsed. Begin today. Write for: ☐ **New Free Book,** "How to Become a Good Penman", or check books wanted, $1.00 each. ☐ Business Writing ☐ Artistic Writing ☐ Card Writing ☐ Engrossing Alphabets ☐ Bird and Design Flourishing ☐ Complete Set $4.50 ☐ Enclose 10c for your name beautifully written and shading penpoint.

S. A. Ziller, President, TAMBLYN SCHOOL OF PENMANSHIP
439 Ridge Bldg. *In Business Over 52 Years* **Kansas City, Mo., U.S.A.**

ENGINEERING DEGREE IN 27 MONTHS

INDIANA TECHNICAL COLLEGE

Aeronautical, Chemical, Civil, Electrical, Mechanical, and Radio Engineering (inc. television). Drafting. 1-yr. Gov't approved for G.I.'s. Low rate. Earn board. Large industrial center. Students from 48 states, 18 countries. Demand for graduates. Enter March, June, Sept., Dec. Catalog.

628 E. Washington Blvd., Ft. Wayne 2, Ind.

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 39 years expert instruction —over 108,000 students enrolled. LL.B. Degree awarded. All texts furnished. Easy payments. G.I. Approved. Send for FREE BOOK.

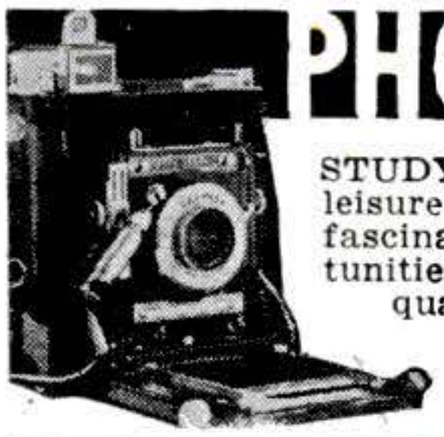
AMERICAN EXTENSION SCHOOL OF LAW
Dept. 86-S, 646 N. Michigan Ave., Chicago, Ill.

RADIO

ENGINEERING Television, FM, Broadcasting, Servicing, Electronics, Aviation, Marine & Police Radio taught thoroughly. 72 weeks' Engineering course equivalent to 3 years' college radio work. Approved Veteran Training. Catalog upon request.

Valparaiso Technical Institute. Dept. 503, Valparaiso, Ind.

PHOTOGRAPHY



for Fun or Profit

STUDY AT HOME. Photography offers leisure time enjoyment and well-paid, fascinating career. Ever-increasing opportunities! Success-proved N.Y.I. training qualifies you at home. Also resident courses. Details FREE!

NEW YORK INSTITUTE OF PHOTOGRAPHY
Dept. 5, 10 West 33 St., New York 1, N. Y., (37th Year)

MAKE MONEY—WITH CHIN-CHINS

No experience needed. Start with pure-bred CHIN-CHIN Chinchilla rabbits—a few females and a male—you'll soon have at small cost, a large, profitable herd. FREE INSTRUCTIONS. BIG DEMAND for breeding and laboratory stock, meat, and world's most beautiful rabbit fur. DEALERS. CUT OFF FROM IMPORTED RABBIT PELTS BY WORLD FAMINE, NEED CHIN-CHIN FURS NOW AND FOR YEARS TO COME! Write today for free, illustrated catalog.

WILLOW BROOK FARM • R-11A SELLERSVILLE, PA.

Copyrighted material

Profit Through Training in RADIO-ELECTRONICS

Prepare at HOME or in our CHICAGO LABORATORY to get REAL MONEY, a BETTER JOB, or a BUSINESS OF YOUR OWN . . . .

Our business is helping men . . . and young men . . . get into a well-paying future in the highly profitable fields of RADIO-ELECTRONICS. During the past sixteen years we have trained many men who desired better jobs or businesses of their own. We can effectively provide you with this same opportunity either in our new, modern Chicago laboratories or in the privacy of your own home.

TAKE YOUR CHOICE

If you choose to come to Chicago, we shall find comfortable living quarters for you. If you train at home, we shall send you modern, practical equipment. In either of these two methods, you will have the supervision of some of the finest instructors in the country. Fill in coupon below and we shall send you, absolutely FREE, full information about our program of building men for better opportunities in RADIO-ELECTRONICS. DeForest's Training, Inc. also includes instruction in FM Radio, Television and Industrial Electronics.

If you prefer to remain at home, you receive eight (8) big kits of radio parts and assemblies from which you can work out dozens of fascinating radio circuits to gain practical experience in your own home. In addition, you receive a 16 mm. motion picture projector and 12 information-packed reels of film which help you learn faster . . . easier. You also get modern looseleaf lessons with handy fold-out diagrams.

EMPLOYMENT SERVICE

When you complete your training our effective Employment Service helps you get started toward a real future. Mail coupon below today . . . do not delay.

VETERANS

Both our (1) Chicago Laboratory and (2) Home Study training are accepted under the "G. I. Law." If you qualify, the Government will pay cost of either training you select.

MAIL THIS OPPORTUNITY COUPON *NOW!*

Mr. E. B. De Vry, President
DeForest's Training, Inc.
2533 N. Ashland Ave., Dept. PS-2
Chicago 14, Illinois

Please show me how I may get started toward a good job or a business of my own in Radio-Electronics.

Name.....Age.....

Address.....Apt.....

City.....Zone.....State.....

☐ If under 16, check here for special information.

☐ If a discharged Veteran of World War II check here.

DeForest's Training, Inc. CHICAGO, ILLINOIS

Associated with the DeVRY Corporation
Builders of Movie & Electronic Equipment

Copyrighted material

HOW TO Fight! Wrestle! Jiu-Jitsu!

FREE

Plus Weight Lifting! Strong Man Stunts!

Be prepared to protect your family, friends, yourself in any emergency! Be admired! George F. Jowett, Champion of Champions, gives you free his "SMASHING CHAMPION SECRETS." Contains many "HOW-TO-DO-IT" pictures that quickly and simply show you how to powerfully deliver a knockout, how to break any hold, how to overpower any opponent plus weight lifting and strong man stunts! Inside professional "Tricks of the Trade" proved successful by police, armed forces, fighters, wrestlers, etc.! Free for a limited time with this sensational offer!

YOU NEED HE MAN FITNESS TO HANDLE ANY TOUGH SITUATION!

NOW! All 5 Famous JOWETT COURSES in 1 Complete Muscle Building Volume! **25c**

LET ME PROVE I CAN MAKE YOU—

COMMANDO-TOUGH

OR IT WON'T COST YOU A CENT!

says *George F. Jowett* WORLD'S GREATEST BODY BUILDER

Give Me 10 Minutes A Day
Learn My Time Tested Secrets of Strength

I'll teach you the "Progressive Power Method" that rebuilt me from a physical wreck condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! Has proven it builds the strongest, handsomest men in the world. Let me prove on a money back basis—that no matter how flabby or puny you are that I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a rock-like back—in fact power pack your whole body so quickly it will amaze you—right in your own home! I'll bring to life new power in you inside and out, until YOU are satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

Send only 25c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles.

10 DAY TRIAL!

Think of it—all five of these famous courses now in one picture-packed volume for only 25c. If you're not delighted with this famous muscle-building guide — if you don't actually FEEL results within ONE WEEK, send it back and your money will be promptly refunded!

I am making a drive for thousands of new friends fast —REGARDLESS OF COST!

SO GET NOW MY 5 Muscle Building COURSES (Valued at $5 each) All in 1 Great Complete Volume *Packed With How-To-Do-It Pictures!* For Only 25c

Now, this "get-acquainted," extremely low price of only 25c is your chance to build a body you'll be proud of! Follow Jowett's easy method of muscle building NOW!

PHOTO BOOK OF FAMOUS STRONG MEN!

FREE!

Photos that inspire you to might and muscle. Free with order.

FREE GIFT COUPON!

George F. Jowett Champion of Champions

Jowett Institute of Physical Culture Dept. P S-82
230 Fifth Avenue, New York I, N. Y.

George F. Jowett:—Please send by return mail, prepaid, FREE Jowett's Photo Book of Strong Men, along with all 5 Muscle Building Courses. **1.** Molding a Mighty Chest. **2.** Molding a Mighty Arm. **3.** Molding a Mighty Grip. **4.** Molding a Mighty Back. **5.** Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 25c. NO C.O.D.'S.

NAME..... AGE.....
(Please Print Plainly, Include Zone Number)

ADDRESS.....

Be A MASTER PLUMBER

Earn $15 To $50 A Day

DON'T ENVY THE PLUMBER—BE ONE

Every skilled workman will tell you that Plumbers have the best of it. WINTER and SUMMER the Plumber is busy at top wages. No skilled Plumber is ever out of a job—compare his opportunities with any trade, plus the opportunities of having your own shop.
We teach you Plumbing with TOOLS (not books) under Licensed Master PLUMBERS in one of the finest equipped schools in America. We make you a Plumber, every branch is taught thoroughly—Lead Work—Blueprint for plan reading—all other tricks.

LEARN IN 30 WEEKS WITHOUT PREVIOUS EXPERIENCE

If you like to work with tools you owe it to yourself to investigate. No need to ever work as an apprentice. Get free bulletin. Write now! G.I. APPROVED. Our 24th year.

UNIVERSAL PLUMBING SCHOOL
819 HOLMES STREET KANSAS CITY, MO.

Learn to MOUNT BIRDS

Tan SKINS, make up FURS

Be a Taxidermist. *Double your hunting fun.* We teach you **at Home.** Mount **Birds, Animals, Fish, Heads,** common specimens. **Fun and profits.** Decorate home and den **MAKE MONEY.** Mount game, tan for others. Big profits in spare time. **WRITE TODAY.**

100 game pictures in FREE BOOK
Hunters, get your copy. It's **Now Free.** Send post card. State your **AGE.**

FREE BOOK

NORTHWESTERN SCHOOL OF TAXIDERMY
Dept. 9392 Omaha, Nebraska

ANALYZE HANDWRITING

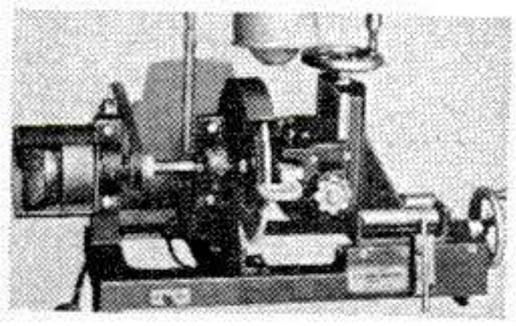
Illustrated Lesson and Grapho Analyst FREE

shows you how to make money at home, full or spare time. Opportunities everywhere. **FREE Analysis Offer** for immediate answer. Must be over 21.
A.I.G.A. Inc., Wilhoit Bldg., Dept. 126-M, Springfield, Mo.

"How to Make Money With Simple Cartoons"

A book everyone who likes to draw should have. It is free; no obligations. Simply address

CARTOONISTS' EXCHANGE
Dept. 192-D Pleasant Hill, Ohio



Start a NEW BUSINESS

Sharpen Dull Pipe Wrenches

Or Add to Your Present Repair Business

Write for information.

J. C. MOORE INDUSTRIES P.O. Drawer 276 FREDONIA, PA.

CODE-SENDING-RECEIVING SPEED

Learn to send and receive Radio Code with greater speed. Stop nervous tension. Have confidence. Be proficient. Same system used by radiotelegraph specialists. Thousands of operators needed. Rush name for FREE book.

CANDLER SYSTEM CO.
Dept. 6-B, Box 928, Denver 1, Colo., U. S. A.

★ PSORIASIS ★

PSORIASIS SUFFERERS: Has everything failed to bring **even** temporary relief from scales, lesions and itching? Then **write** today for FREE important information. You needn't invest **one** cent!
PIXACOL CO., Dept. S-2, Box 3583, Cleveland, Ohio

Copyrighted material

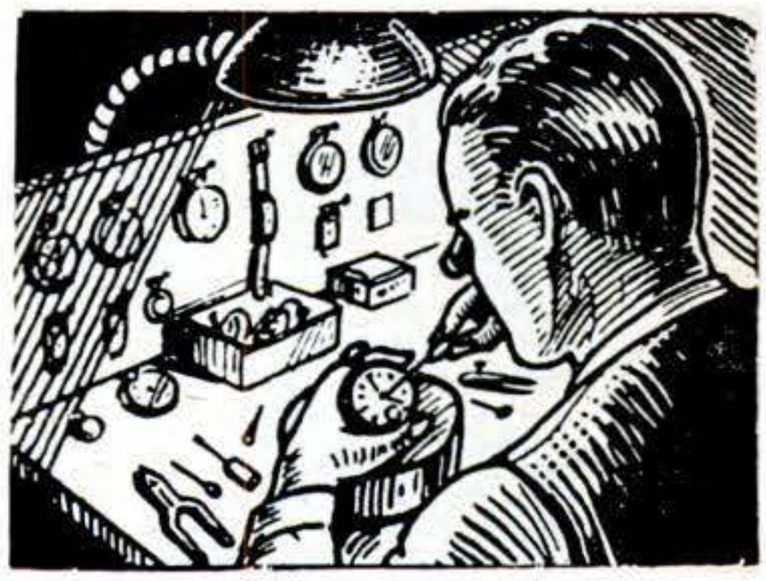
HOME TRAINING WITH TOOLS

Quickly Prepares You For

BIG PAY EARNINGS

In An Uncrowded Field

Today's high living costs demand high earning power. Here then, is your opportunity to increase your earning power and insure your future — by learning the fascinating art of watch repairing in your spare time at home. No loss from your present work! No mechanical experience needed!



No Previous Mechanical Experience Necessary!

● ACTUAL WATCH REPAIRING WITH EACH LESSON

Our spare time Home Training thoroughly instructs you in all the rudiments of Watch Repairing. Enables you to master the complete 10-lesson course quickly, easily with a Diploma issued upon your graduation. We furnish all necessary tools and teach you actual watch repairing with the use of these tools. You learn how to take any watch apart and put it together in fine working order—to make part replacements—to clean and expertly repair any watch. Ours is a proven course. It has taught and is teaching both men and women expert watch repairing. It can do the same for you.

● WATCH MAKERS WANTED

An enormous need exists for trained Watch Makers everywhere and this need is increasing daily with increased watch production. Watch repairing is a big pay profession that is steady the year around. No dull seasons. Work for others or start your own shop.

FREE WATCH and WORKING TOOLS
included as part of your course

ILLINOIS SCHOOL OF WATCH REPAIRING
2870 ELSTON AVENUE
CHICAGO 18, ILLINOIS

● *Get All the Facts—Then Judge*

Just clip and mail coupon — now — for free information that gives you all the startling facts about our truly amazing Spare Time Home Training Course — and our easy payment plan.

EARN WHILE YOU LEARN SPARE TIME PLAN HELPS YOU TO PAY FOR YOUR COURSE!

ILLINOIS SCHOOL OF WATCH REPAIRING
2870-AP ELSTON AVE., CHICAGO 18, ILL.

Kindly send me FREE LITERATURE on your Spare Time Home Training Course in WATCH REPAIRING. I understand no salesman will call on me.

Name.....

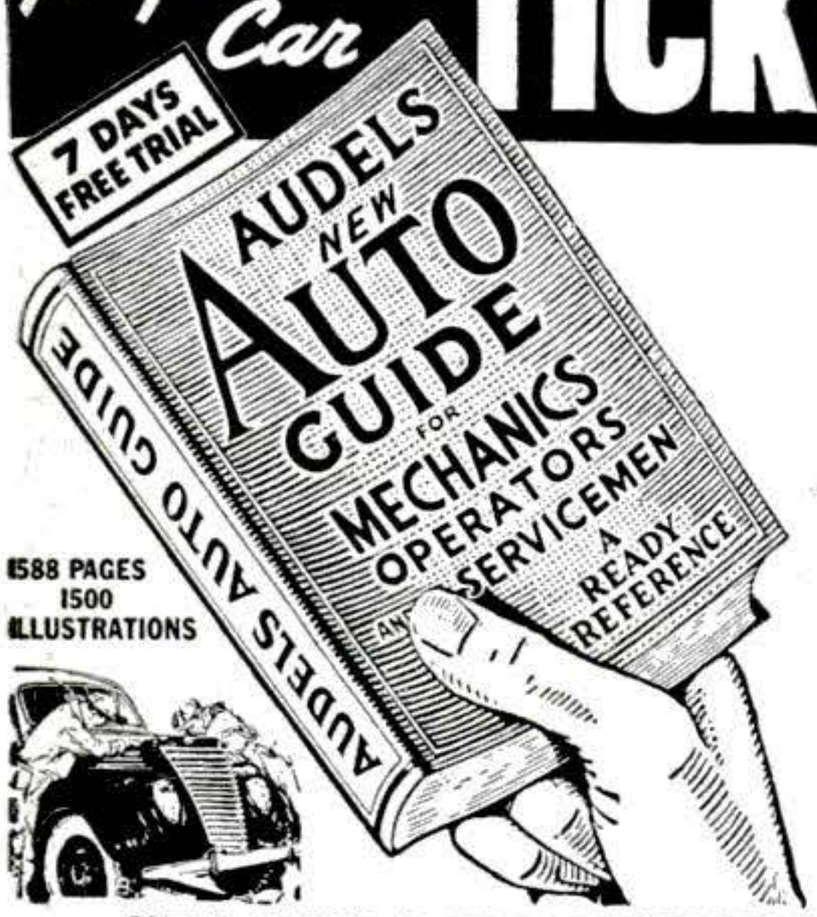
Address.....

City.....Zone.....State.....

Copyrighted material

Keep that "TICKING" Car

7 DAYS FREE TRIAL



1588 PAGES
1500
ILLUSTRATIONS

Every operator and mechanic needs AUDELS AUTO GUIDE.

This book saves time, money and worry. Highly endorsed. It presents the whole subject of auto mechanics:

1—Basic principles
2—Construction
3—Operation
4—Service
5—Repair

Handy Size. Easily understood.

NEW FLUID DRIVE, HYDRAULIC SHIFT AND DIESEL ENGINES FULLY COVERED

Over 1500 pages—1540 illustrations showing inside views of modern cars, trucks and buses with instructions for all service jobs.

$4 COMPLETE • PAY ONLY $1. A MONTH ←

ASK TO SEE IT!—To Get This Assistance for Yourself Simply Fill in and Mail Coupon Today.

AUDEL, Publishers, 49 West 23rd St., New York

MAIL AUDELS NEW AUTO GUIDE for free examination. If O.K. I will send you $1 in 7 days; then remit $1 monthly until price of $4 is paid. Otherwise I will return it.

Name _____

Address _____

Occupation _____

Employed by _____ P.S.M.

Learn to Repair ELECTRIC APPLIANCES

AT HOME in your SPARE TIME

WRITE TODAY for FREE BOOK

Prepare now for a permament future, independence and security with a business of your own. Our practical, easy-to-learn home course teaches you, during your spare time, how to repair washing machines, vacuum cleaners, electric ranges, lamps, motors, irons, etc., REFRIGERATION and HOUSE WIRING.

OPEN YOUR OWN SHOP

For the man who is handy with tools, and likes to work with his hands as well as his head, there is a WIDE OPEN OPPORTUNITY today, in this great growing field. If you own your own shop you can depend on making more money in good times . . . and not losing your job in a depression. You can start a business of your own in your garage or basement with the tools we send you. One good repair job can pay for the cost of the entire course. Write today for our FREE BOOKLET.

I Send You a BIG KIT of Special TOOLS at NO EXTRA COST!

PACIFIC TRAINING SCHOOL
7217 So. Broadway, Dept. S-82, Los Angeles 3, Calif.

Dear Sirs: Please send me, without obligation, your free booklet and complete details.

Name .....

Address .....

City ..... *State* .....

Learn to SPEAK SPANISH

FRENCH GERMAN ITALIAN

Famous Cortina Method Makes It EASY

COUNT CORTINA

BIG OPPORTUNITIES await Americans who speak SPANISH. Learn as a child learns — "by listening" to these new CORTINA recordings. The CORTINAPHONE METHOD, famous for 65 years, teaches you to speak SPANISH as a NATIVE speaks! Right at home, relaxed and at ease.

Listen to this Record!

Sent on 5 Days' Approval

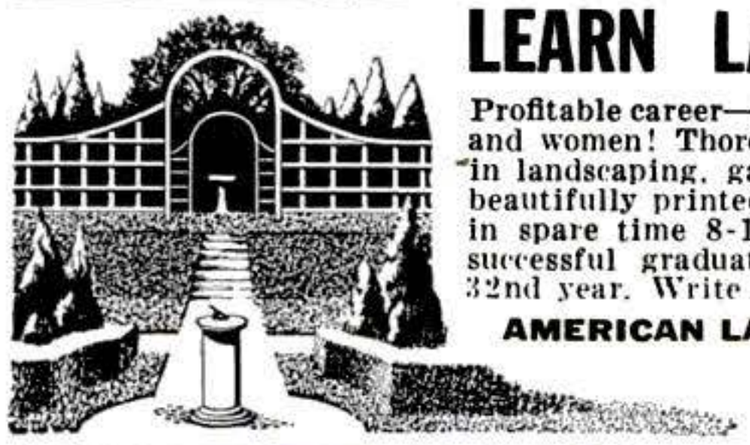
Write **today** for our amazing free book, "The Cortina Short-Cut." State language interested in.

VETERANS When writing for free book—mention that you are a veteran.

CORTINA ACADEMY
Dept. 122, 105 West 40th St., New York 18, N. Y.

FREE BOOK

LEARN LANDSCAPING



Profitable career—absorbing hobby for men and women! Thorough home-study course in landscaping, garden design. 45 lessons beautifully printed and illustrated. Learn in spare time 8-12 months. Hundreds of successful graduates all over the world. 32nd year. Write for *Free* Catalog.

AMERICAN LANDSCAPE SCHOOL
6476 Grand Ave.
Des Moines, Ia.

LEARN TO DRAW & PAINT

LANDSCAPES, PORTRAITS, FIGURES, ANIMALS.
No Previous Training Necessary

IF YOU LIKE TO DRAW YOU HAVE TALENT. YOU CAN DEVELOP THAT TALENT THROUGH OUR **HOME STUDY COURSE**. LEARN TO DRAW AND PAINT IN YOUR SPARE TIME. WRITE FOR INFORMATION.

JOHN CLINTON ART INSTITUTE, Inc.
STUDIO C PALM BEACH FLORIDA

The American Institute of Specialized Watch Repair
270-276 East Building GRAND RAPIDS 6, MICHIGAN
A Fully Accredited School

You can learn this highly fascinating and profitable trade through this Institute, either at home by correspondence . . or at the resident school.
Earn While You Learn

Write for Free Circular

Learn WATCH REPAIRING

Burn-Rite Wood Burning Detachable Pen

Approved by Underwriters
Only one of its kind. Write for complete list of casting and wood burning sets.

$1.50 EACH POST PAID

RAPAPORT BROS. INC.
Dept. PS2, 1830 S. Washtenaw Avenue Chicago, Illinois

• SHOE SHINES ARE COSTLY NOWADAYS •

E-Z SHINE Shoe Holder

$2.50

Home Shoe Shine Bracket Adjustable to men's, women's, children's sizes. Demountable. Money Back Guarantee.

(You pay postage if C. O. D.)

Send check or money order and we pay postage

WAYNE MFG. CO. Wayne, Penna. DEPT. P.S.

NEW HELP FOR RUPTURE!

is the amazing book which explains simple, inexpensive, easy, proven way for curbing your rupture, right at home. This proven way has helped many rupture sufferers quickly. So don't let your rupture get worse. **PRICE ONLY 3.00 POSTPAID.** (Sent in plain wrapper.)

BRADNER PUBLISHING CO. (Established 1933) Dept. H-2, Dixon, Ill.

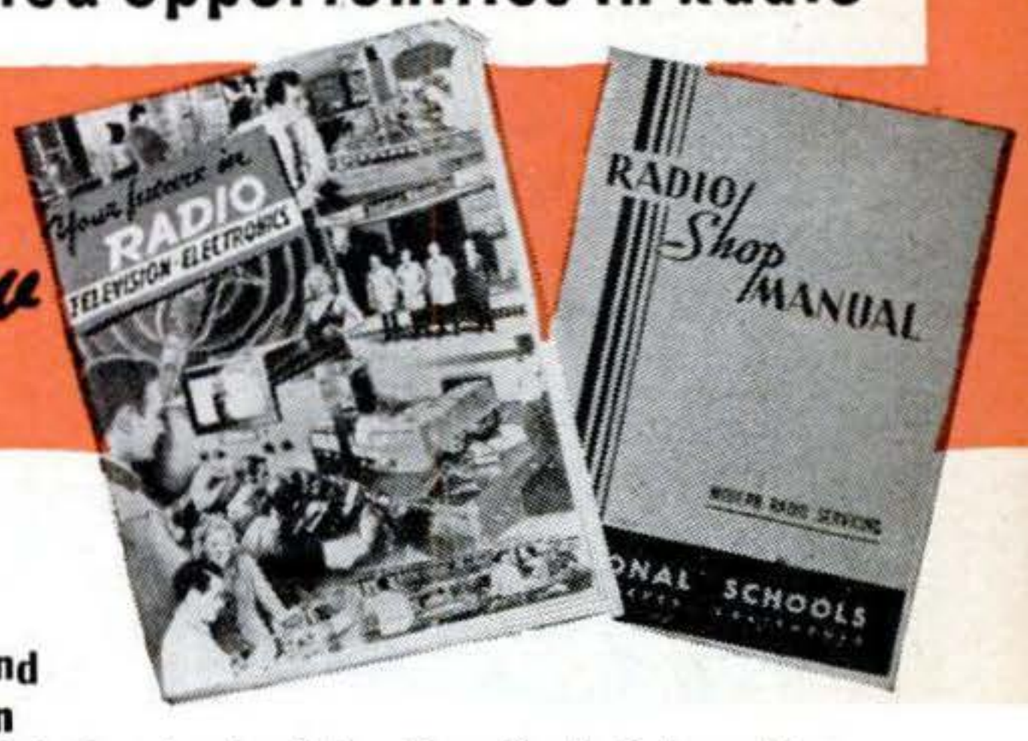
Copyrighted material

Learn RADIO TELEVISION, ELECTRONICS *by* SHOP METHOD HOME TRAINING

Let NATIONAL SCHOOLS, of Los Angeles, a practical Technical Resident Trade School for over 40 years, train you for today's unlimited opportunities in Radio

You receive all parts, including tubes, for building this fine, modern Superheterodyne Receiver. This and other valuable standard equipment becomes your property.

these two **FREE** *books will tell you how*



GOOD JOBS AWAIT THE TRAINED RADIO TECHNICIAN

You are needed in the great, modern Radio, Television and Electronics industry! Trained Radio technicians are in constant and growing demand at excellent pay—in Broadcasting, Communications, Television, Radar, Research Laboratories, Home Radio Service, etc. National Schools Master Shop Method Home Study Course, with newly added lessons and equipment, can train you in your spare time, **right in your own home,** for these exciting opportunities. Our method has been proved by the remarkable success of National Schools-trained men all over the world.

You Learn by Building Equipment with Standard Radio Parts We Send You

Your National Schools Course includes not only basic theory, but **practical** training as well—**you learn by doing.** We send you complete standard equipment of professional quality for building various experimental and test units. You advance step by step until you are able to build the modern superheterodyne receiver shown above, which is yours to keep and enjoy. You perform more than 100 experiments—build many types of circuits, signal generator, low power radio transmitter, audio oscillator, and other units. The Free Books shown above tell you more about it—send for them today!

NOW! NEW PROFESSIONAL MULTITESTER INCLUDED

This versatile testing instrument is portable and complete with test leads, batteries and tubes. Simple to operate, accurate and dependable. You will be able to quickly locate trouble and adjust the most delicate circuits. You can use the Multitester at home or on service calls. It is designed to measure AC and DC volts, current, resistance and decibels. You will be proud to own and use this valuable professional instrument

GET THE DETAILS—SEND THE COUPON

Lessons and Instruction Material Are Up-to-date, Practical, Interesting

National Schools Master Shop Method Home Training gives you basic and advanced instruction in all phases of Radio, Television and Electronics. Each lesson is made easy to understand by numerous illustrations and diagrams. All instruction material has been developed and tested in our own shops and laboratories, under the supervision of our own engineers and instructors. A free sample lesson is yours upon request—use the coupon below.

Here's Just a Few of the Interesting Facts you Learn with the **FREE MANUAL**

1. Routine for diagnosing Radio Troubles.
2. Preliminary inspection of Receivers.
3. How to Test and Measure Voltages.
4. How to Test Speaker in Audio Stages.
5. How to Trace the Circuit and Prepare Skeleton Diagram.
6. Complete Reference Table for Quickly Locating Receiver Troubles.

VETERANS

If you are a veteran, qualified for training under the G.I. Bill, check the coupon for a Special Bulletin.

G. I. APPROVED

NATIONAL SCHOOLS

LOS ANGELES 37, CALIFORNIA EST. 1905

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

National Schools, Dept. PS-2
4000 South Figueroa Street
Los Angeles 37, California

(Mail in envelope or paste on penny postcard.)

Mail me FREE the books mentioned in your ad including a sample lesson of your course. I understand no salesman will call on me.

NAME..... AGE.....

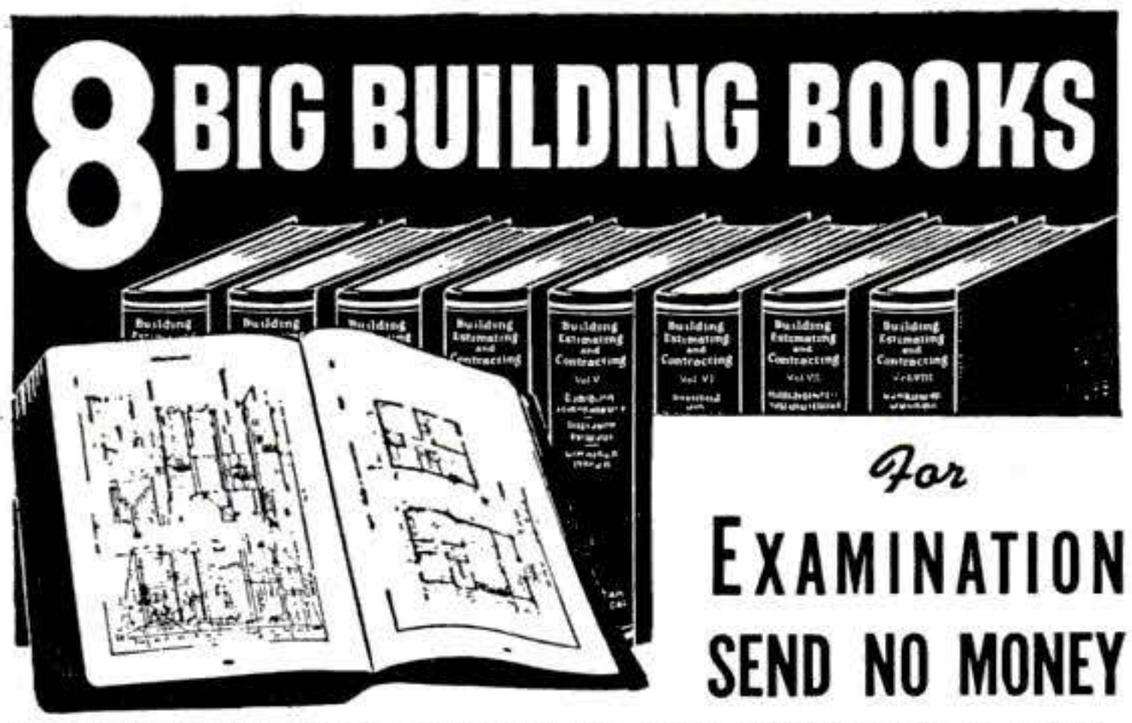
ADDRESS.....

CITY..... ZONE.... STATE.....

☐ **Check here if veteran of World War II**

Copyrighted material

8 BIG BUILDING BOOKS



For

EXAMINATION
SEND NO MONEY

Learn to draw plans, estimate, be a live-wire builder, do remodeling, take contracting jobs. These 8 practical, profusely illustrated books cover subjects that will help you to get more work and make more money. Architectural design and drawing, estimating, steel square, roof framing, construction, painting and decorating, heating, air-conditioning, concrete forms and many other subjects are included.

BETTER JOBS — BETTER PAY

The postwar building boom is in full swing and trained men are needed. Big opportunities are always for MEN WHO KNOW HOW. These books supply quick, easily understood training and handy, permanent reference information that helps solve building problems.

UP-TO-DATE EDITION

These books are the most up-to-date and complete we have ever published on these many subjects.

Coupon Brings Eight Big Books For Examination

AMERICAN TECHNICAL SOCIETY Vocational Publishers since 1898
Dept. G220 **Drexel at 58th Street** **Chicago 37, Ill.**

You may ship me the Up-to-Date edition of your eight big books, "Building, Estimating and Contracting," without any obligation to buy. I will pay the delivery charges only, and if fully satisfied in ten days, I will send you $2.00, and after that only $3.00 a month, until the total price of only $34.80 is paid. I am not obligated in any way unless I keep the books.

Name.....

Address.....

City.....State.....

Please attach a letter stating your age, occupation, employer's name and address, and name and address of at least one business man as a reference. Men in service, also please give home address.

VETERANS Learn WATCHMAKING

A Lifetime Career

No Age, nor Physical Limitations

YOUR OPPORTUNITY

To Lift Yourself from a Futureless Job

LEARN WATCHMAKING

and earn from the start, higher than average pay . . . easy hours . . . ideal working conditions . . . be prepared to establish your own business.

WATCH REPAIRING—JEWELRY—ENGRAVING

Always in Demand

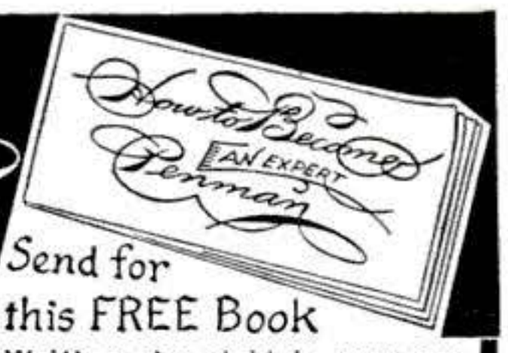
Requests for our Graduates from Everywhere. Permanent positions (no layoffs) $75.00—$100 per week for trained men. Write today for latest FREE Catalog.

KANSAS CITY SCHOOL OF WATCHMAKING

America's Most Progressive Horological School

619 WYANDOTTE ST. KANSAS CITY 6, MO.

Learn to Write



Send for this FREE Book

GOOD PENMANSHIP makes favorable impressions and helps you win success. Poor penmanship contributes to failure. It makes no difference how poor you now write, you can quickly and easily learn **Business Writing,** and you can learn **Shaded Writing** also right in your own home during spare time by my **Simplified Method,** without cost of going away to school. Easy lessons. Diploma.

BEGIN NOW! Write for my FREE BOOK, "How to Become an Expert Penman," which contains valuable information and many specimens of penmanship that show what others have learned by taking my Courses. If you enclose 10c, I will send you one of my Favorite Penpoints suitable for plain or shaded writing, and your name with a beautiful flourished bird written on a card. Write TODAY.

T. M. TEVIS, BOX 25R, CHILLICOTHE, MO.

REFRIGERATION and AIR CONDITIONING

REFRIGERATION TRAINING Since 1927

MECHANICAL units everywhere need servicing. Soon new units will require installation service. You can be ready with reliable pay-knowledge of this big income field. Unique home study-plus actual practice plan prepares you to enter servicing or installing field or get into business of your own. Great opportunities now and later. Get facts FREE. Write today!

UTILITIES ENGINEERING INSTITUTE
Dept. 328, 2525 Sheffield Ave., Chicago 14, Ill.

TRI-STATE COLLEGE

B.S. Degree in 27 months in Engineering (7 branches), Bus. Admin., Acctg. and Sec. Science. Graduates successful. **64th year.** Enter Sept., Jan., March, June. Write for catalog. **528 College Ave., Angola, Ind.**

Be an Investigator!

Our course in scientific crime detection may be studied in the quiet of your own home. Investigation training course written and supervised by former U. S. Government Investigator. Write today for full particulars and free booklet. No obligation whatever.

PACIFIC SCHOOLS, INC.
601 S. VERMONT AVE., DEPT. P-3 LOS ANGELES 5, CALIFORNIA

LOOK! It actually Flies—this NEW model

HELICOPTER

Jet model—soars up 100 ft.—a string operates it. Aluminum, with 12-inch rotor, only $1.69 complete. Send $1 with name and address. Pay postman balance of 69c plus postage. Order now.

ROBERT SALES, Dept. K2
727 Hennepin Ave. Minneapolis, Minn.

FENCING

World's Finest Sport
Exciting Fun—Harmless

Just Out! Two 3 ft. Spring Steel Foils with Safety Rubber Buttons, Complete Outfit 2 foils (swords) with hand guards and Free Instruction Book Now Only $1.98 Postpaid. A healthful & clean sport, makes you Strong & Alert. Instruction Book teaches Quickly-Easily. Mail check or Money Order for $1.98 Today. Add 28c for Foreign postage.

LEE PRODUCTS CO., 1613-C First Ave., New York 28, N. Y.

Photography for

PLEASURE or PROFIT

Learn at home. Spare time. Practical basic training. Long-established school. Many have earned while learning. Send coupon below for free booklet, "Opportunities in Modern Photography" and full particulars.

AMERICAN SCHOOL OF PHOTOGRAPHY
1315 Michigan Avenue Dept. 1362 Chicago 5, Illinois

Send booklet, "Opportunities in Modern Photography," full particulars and requirements. No salesman will call.

Name.....*Age*.....

Address.....

City.....*Zone*.....*State*.....

Copyrighted material

ACE *Hollywood Experts* WILL TRAIN YOU AT HOME *to MAKE GOOD in*

RADIO TELEVISION-ELECTRONICS

through practical EXPERIMENTS with

10 BIG KITS of RADIO PARTS R.T.A. GIVES YOU!

YOU WILL DO SCORES OF PRACTICAL JOBS AND EXPERIMENTS

The 10 BIG KITS RTA GIVES YOU enable you to do many practical jobs. Illustrated above are only a few of the many job-exercises you do. You build a TRF Receiver, a High-Frequency Converter, a complete, powerful 6 Tube AC-DC Superheterodyne receiver, and perform more than a hundred other fascinating and valuable experiments. These jobs you do give you ACTUAL SHOP EXPERIENCE so vitally necessary to future success. Thus RTA methods assure you BALANCED TRAINING—Theory PLUS Real Experience.

Tear out coupon and mail today

MASTER HOLLYWOOD TECHNICIANS *Guide You*

It was no accident that RTA — RADIO TRAINING ASSOCIATION OF AMERICA — chose HOLLYWOOD as their headquarters. Hollywood has long been recognized as the very heart of America's Broadcasting, Television, Radio and Sound industries. Thus, RTA is right "on-the-spot" where new technical improvements are introduced, and is in the best possible position to bring students ACTUAL METHODS and TECHNIQUES developed BY the RADIO-TELEVISION industry, leading to real money-making opportunities!

OPPORTUNITIES *NOW* WIDE OPEN for Properly Trained Men

Latest reports estimate 400 MILLION new radio and television sets will be built in the next ten years . . . and more than 72 million dollars is being spent RIGHT NOW just for radio repairs ALONE! When you are thoroughly trained by RTA's Hollywood Experts—who have their fingers on the pulse of the Radio-Television industry—you can imagine what undreamed of opportunities await you in Your Own Radio Sales & Service Business, Television, Aviation, FM, Manufacturing and Communications, etc.

EARN *EXTRA MONEY while learning* AT HOME

Under RTA's amazingly easy, practical home-training plan there is no need for you to quit your present job. You study in SPARE TIME ONLY and RTA's Hollywood Experts show you how to earn WELCOME EXTRA CASH, even BEFORE FINISHING YOUR TRAINING! In fact, when friends and neighbors know you are studying Radio-Television you may—like many RTA students—actually get MORE REPAIR WORK THAN YOU CAN HANDLE.

25 Year Success Record

Backed by more than 25 years of experience in the home training field, RTA's practical "learn by doing" methods assure you quick, step-by-step progress. So begin preparing for your future in Radio-Television NOW, while the time is ripe. If you are at all mechanically inclined, and have a grammar school education, RTA can teach you how to MAKE GOOD as a Radio-Television technician.

R. T. A. GRADUATES SAY:

★ Thanks to R.T.A. I started my own radio store . . am making 220 percent more than when I enrolled.—W. E. Thon, Chicago.

★ Truly thankful for the day I enrolled for R.T.A. Course . . . it fitted me splendidly for my present position.—N. R. Hoffman, Radio Station WCOD, Harrisburg.

★ . . . R.T.A. sure opened my eyes to big money . . . thanks for all you have done for me.—Ernest Lancott, Cleveland.

APPROVED for VETERANS

GET FACTS! SEND FOR FREE BOOK!

● telling all about RTA's streamlined home-training plan, developed by technicians in the heart of the booming Radio-Television field. Fill out the coupon TODAY and your FREE BOOK, entitled "How To Make Good In Radio-Television" will go out to you AT ONCE! No Obligation. RTA APPROVED FOR VETERANS.

RADIO TRAINING ASSOC. OF AMERICA, DEPT. PSB
5620 Hollywood Blvd., Hollywood 28, Calif.

Send FREE BOOK showing how to make good in Radio and Television, through training by Hollywood experts.

NAME _____ AGE _____

ADDRESS _____

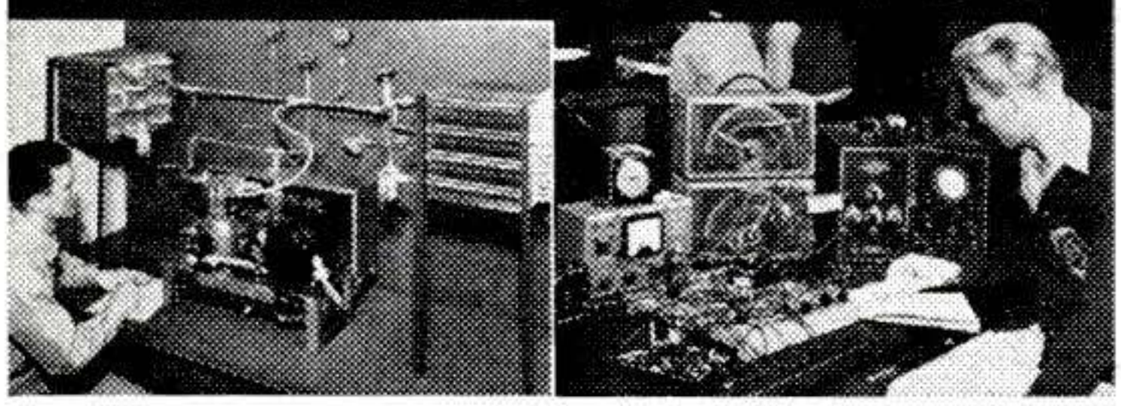
CITY _____

ZONE _____ STATE _____

Check box if VETERAN of World War II ☐

Copyrighted material

PRACTICAL TECHNICAL TRAINING FOR YOU



SPECIALIZE in 6 months to 3 years

OUR time-tested CONCENTRIC SYSTEM enables you to build your career step by step. Each 6-month course is complete in itself yet prepares you for advanced courses. You train as long as circumstances permit—until you reach the "top step" in your desired occupational objective. More than 35,000 former students in industries the world over.

COURSES

SERVICE — 6 to 12 months
Practical Electricity
Practical Welding
Refrigerator Service
Heating Service

TECHNICIAN — 1 to 2 years
Electro Technician
Radio Technician
Electronics Technician
Refrigeration, Heating and Air Conditioning Technician

PROFESSIONAL — 3 years
Electrical Engineering
Bachelor of Science Degree
Major in Machinery or Electronics

MILWAUKEE
SCHOOL of ENGINEERING
A Technical Institute
Terms Start April, July, September

MAIL COUPON TODAY!

Milwaukee School of Engineering,
Dept. PS-248, N. Broadway & E. State, Milwaukee, Wis.
Without obligation, send me free booklet "Career Building" and more details on course in.....

Name.....Age.....

Address.....

City.....State.....

ELECTRIC LIGHT JAZZ BOW TIE!

Astonish, amaze your friends. Be the life of the party. Have lots of fun. Easily put on. Flashes on and off by simply pressing battery button hidden in your pocket. Complete with attractive bow tie, cord, two bulbs and battery. Mail your order today.

$1.95

New Scientific "GUZZLIN CHARLIE"
Mystery Drinking Bird with Roly Poly Eyes

$1.95 Complete with stand. No springs, no gadgets, no wires, not mechanical. Amazing "Guzzlin Charlie" drinks and drinks; he is always thirsty. You won't believe your eyes. Young and old go wild over him.

Send No Money. Just send your name and address, pay postman upon delivery, plus delivery charges or remit with order and we pay charges. Rush your order today. Special prices on all articles to dealers.

BERNARD FINE CO., INC.
501 Sixth Ave., Dept. PSM9, New York 11, New York

Have an OFFICE OF YOUR OWN!

LEARN NEW PROFITABLE PROFESSION
At Home in 60 Days, Men & Women, 18 to 70!

Be Your Own Boss and the Boss of Others. Be Respected. Meet Interesting People.

Earnings of men and women in this profession run as high as $5,000-$15,000 yearly. Others make good money in spare time. Little money needed to start. A business where your earnings begin sooner. Easy to learn. No selling or goods to buy. No experience necessary. A depression-proof business. A course of action to guide you step by step as you earn. All 53 lessons sent at once to use as operating manuals. Easy terms. Diploma. Money-back agreement. Write for **FREE BULLETIN.**

FRANKLIN CREDIT SCHOOL
Dept. 71-B ROANOKE 7, VIRGINIA

BY MAIL in *Easy Lessons*

ARTISTS MAKE MONEY

Do you like to draw? Send name, address, age and occupation for FREE ART TEST, to find out your ability.

ART INSTRUCTION, INC.
2148 Art Instruction Bldg., Minneapolis 15, Minn.

STAMMER?

This new 128-page book, "Stammering, Its Cause and Correction," describes the Bogue Unit Method for scientific correction of stammering and stuttering—successful for 47 years. Benj. N. Bogue, Dept. 4826, Circle Tower, Indianapolis 4, Ind.

GET THIS FREE BOOK!

FREE

MRS. BERRY'S POULTRY BOOK

BABY CHICKS or **STARTED.** Champion-Mated, Licensed-Inspected, B.W.D. TESTED. **52 BREEDS, 6 HYBRIDS.** Sexed or straight. Mature fowls, Hatching Eggs and Remedies. **LOW PRICES. The ORIGINAL Berry's Farm**—over 50 years' service. LARGE BEAUTIFUL BOOK FREE. Stamps appreciated.
BERRY POULTRY FARM, Bx. 25, CLARINDA, IOWA

BREAK or TRAIN DOGS

Keep your dog from running undesired game; train him to run any game wanted. Use Pete Rickard's Famous Dog Musks. Simple, Safe. Sure. STATE YOUR PROBLEM for FREE information or include 1.00 for bottle which usually is enough. Complete instructions.

Satisfaction Guaranteed.

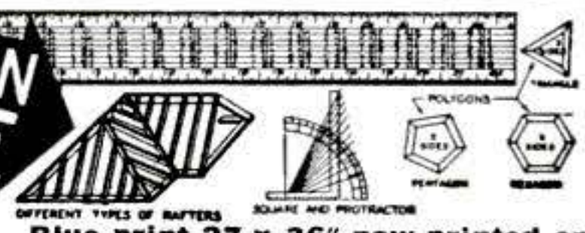
PETE RICKARD Dept. PS-2 Cobleskill, N.Y.

BE A *Real Estate* BROKER

PAYS BIG!

A profitable lifetime career in one of America's finest professions. Many make fortunes selling real estate. Send $2 for our Real Estate Manual. Satisfaction Guaranteed. Literature free.
American Business Builders, Box 2983, Houston, Texas

ANYONE CAN DO THIS IF THEY HAVE OUR CHART



SPECIAL OFFER FOR AGENTS

Blue print 27 x 36" now printed on both sides showing squares full size. Shows how to find the length of any rafter, find any angle, in degrees, frame any polygon three to sixteen sides, read the board foot and bracetable, octagon scale, rafter tables, many other uses, can be scaled down for model work as well as full scale framing. Also chart changing pitches to degrees. For use with radial saws. About 13 square feet of printed copy sent post paid for $1.00. No checks or stamps. MASON ENGINEERING SERVICE. 2032 N. Burdick St., Dept. 2, Kalamazoo 81, Mich.

RUPTURED?

Get Relief This Proven Way

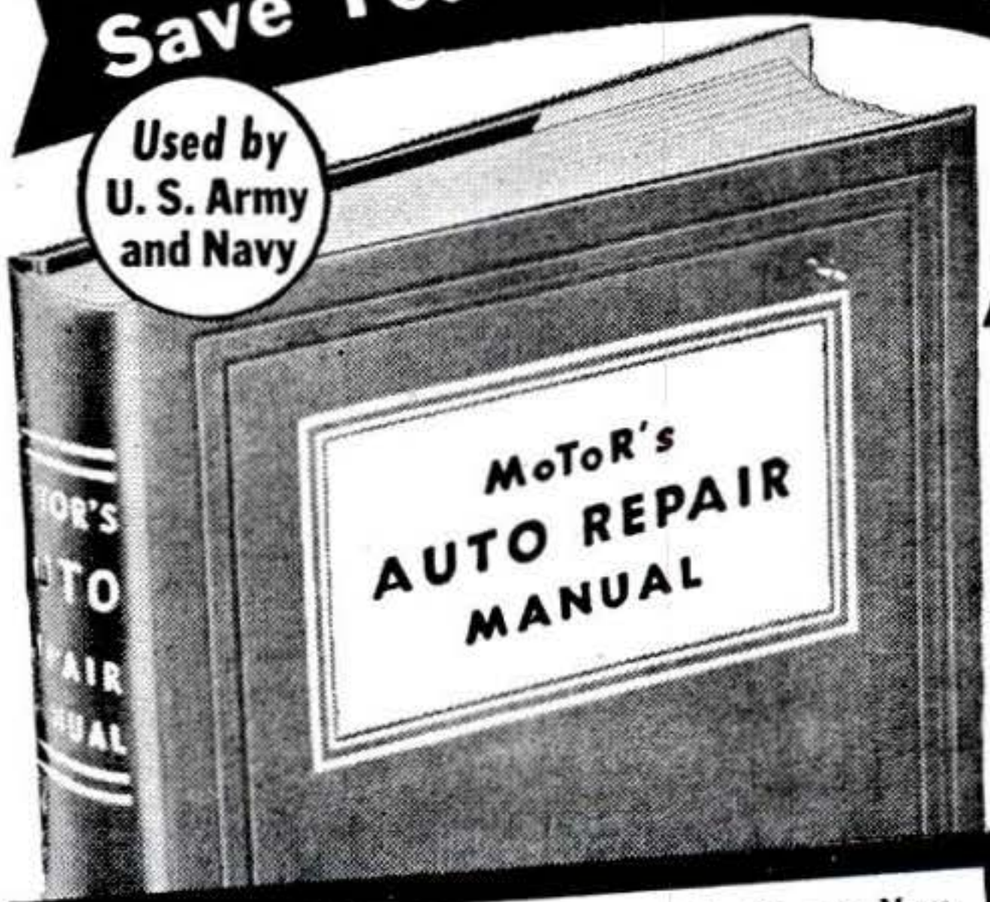
Why try to worry along with trusses that gouge your flesh—press heavily on hips and spine—enlarge opening—fail to hold rupture? You need the Cluthe. No leg-straps or cutting belts. Automatic adjustable pad holds at real opening—follows every body movement with instant increased support in case of strain. Cannot slip whether at work or play. Light. Waterproof. Can be worn in bath. Send for amazing **FREE** book, "Advice To Ruptured," and details of liberal truthful 60-day trial offer. Also endorsements from grateful users in your neighborhood. Write:

Cluthe Sons, Dept. 14, Bloomfield, New Jersey

Copyrighted material

Now! NO AUTO REPAIR JOB IS TOO TOUGH FOR YOU!

Let this New Short-Cut Save You Time and Work!



Used by U. S. Army and Navy

Whether you do auto repairs either as full-time or as part-time work, no service or repair job can "throw" you when you've got MoToR's AUTO REPAIR MANUAL! Just look up make, model, and the job in the streamlined index—and you're ready to lick ANY job from carburetor to rear end. **Faster, easier, better!**

MoToR's AUTO REPAIR MANUAL Shows You How to Service and Repair ANY Part of ANY Car Built Since 1935!

Nearly 200,000 service and repair facts on all 31 makes. 856 big pages; including 50 pages of carburetor text, charts, illustrations, covering all models. Over 500 charts, tables; Tune-up Chart; Valve Measurements; Compression Pressure; Torque Wrench Reading; Starting Motor; Engine Clearances; Generator; Clutch & Brake Specifications; Front End Measurements, etc., Engines; Electric, Fuel, Cooling, Lubricating Systems; Transmissions; Universals; Front Ends; Wheels; Rear Ends, etc.

Covers All These Makes!

American Bantam	Cord	Lafayette	Oldsmobile
Auburn	Crosley	La Salle	Packard
Austin	De Soto	Lincoln	Pierce Arrow
Buick	Dodge	Lincoln Zephyr	Plymouth
Cadillac	Ford	Mercury	Pontiac
Chevrolet	Graham	Nash	Reo
Chrysler	Hudson	Overland	Studebaker
	Hupmobile		Terraplane
			Willys

Try it FREE for 7 Days!

Try this great book for 7 days FREE! It's "headquarters" for 200,000 facts about service, repair, adjustment, replacement, and tune-up—on every car built from 1935 through 1946. The engineer-editors of MoToR Magazine built this Manual for YOU, by collecting and organizing all the vital information from 150 **official factory shop manuals.** Then they put ALL the facts into this ONE amazing workbook.

More Than 1,000 Pictures!

MoToR's AUTO REPAIR MANUAL not only TELLS you clearly what to do. It SHOWS you, too!—in over 1,000 cut-away photos, diagrams, drawings. **856 BIG pages** (8½x11 inches) put the complete "know-how" right at your fingertips! And the fabric binding is strong, built for years of day-in-day-out service!

No wonder it is used by the U. S. Army, Navy, trade and technical schools, thousands of auto servicemen and handymen everywhere! No wonder we're willing to have YOU try it, FREE, for 7 days! Once you use it—and see for yourself how much valuable time and hard work it saves—you'll never again want to be without it!

SEND NO MONEY

7-Day Free Examination

Don't send any cash—unless you wish to do so in order to save postage charges! Simply mail coupon NOW. When postman brings your book, pay him nothing. First make the book **show** you what it does for you! Unless convinced it's the greatest time-saver and work-saver you've ever seen—return book in 7 days, pay nothing. Mail coupon NOW! Address: MoToR Book Dept., Desk 2B, 572 Madison Avenue, New York 22, N. Y.

Same FREE 7-Day Offer Applies on
MoToR's TRUCK REPAIR MANUAL

For mechanics, truck specialists, service stations, fleet owners. Covers EVERY job on EVERY truck made since 1936! 1400 pictures. 952 pages, 300,000 facts. Used by Armed Forces.

All types Gasoline Engines, Diesels, Hesselman. **Fuel Systems, Governors, Lubrication Systems, Ignition Systems, Starters, Generators, Clutches, Transmissions, Axles, Torque Dividers, Transfer Cases, Brakes, Steering,** etc.

ALSO SERVICES many buses, farm and industrial tractors, contractor and road building equipment, stationary power machinery, etc. (on all parts described in Manual.) Check box in coupon at right.

Published by MoToR, The Leading Automotive Business Magazine. MoToR's manuals assure high standards of repair work.

MAIL COUPON NOW FOR 7-DAY FREE TRIAL

MoToR Book Dept., Desk 2B, 572 Madison Ave., New York 22, N. Y.
Rush to me at once: (check box opposite book you want).

☐ **MoToR's AUTO REPAIR MANUAL** If O.K. I will remit $1 in 7 days (plus 35c delivery charge), then $2 monthly for 2 months, and a final payment of 95c one month later. Otherwise I will return book postpaid in 7 days. **(Foreign price, remit $8 cash with order).**

☐ **MoToR's TRUCK REPAIR MANUAL.** (Described at left.) If O.K., I will remit $2 in 7 days, and $2 monthly for 3 months, plus 35c delivery charges with final payment. Otherwise I will return book postpaid in 7 days. **(Foreign, remit $10 cash with order).**

Print Name _____ Age _____

Print Address _____

City _____ Zone No. (if any) _____

State _____ Occupation _____

☐ **Check box and save 35c delivery charge by enclosing** WITH COUPON entire payment of $5.95 for Auto Repair Manual (or $8.00 for Truck Repair Manual). Same 7-day return-refund privilege applies.

Copyrighted material

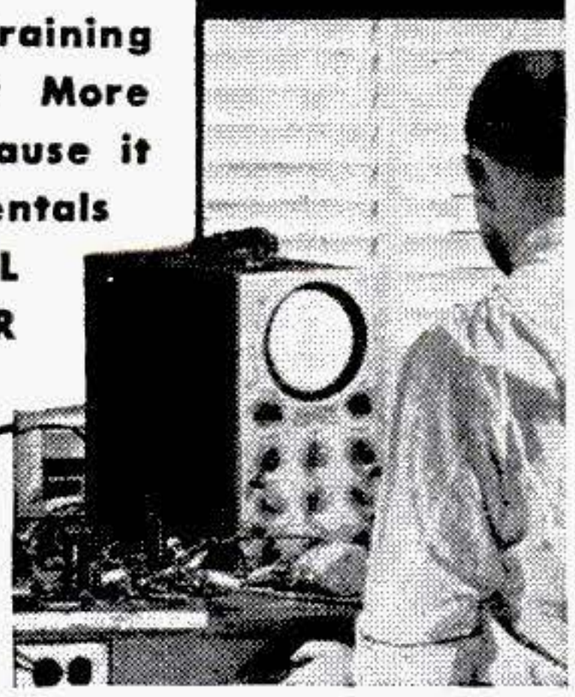
CAPITOL RADIO ENGINEERING INSTITUTE

Stop Dreaming — Start Planning

for a Good-Paying Job in

RADIO-ELECTRONICS TELEVISION

CREI Home Study Training Can Help You *Know* More and *Earn* More...because it Starts with Fundamentals and can TAKE YOU ALL THE WAY TO A CAREER



Qualified Radio-Electronics Engineers and Technicians are in the driver's seat today. More openings exist than there are qualified men to fill them. Vast expansion of the industry has already taken place—and more is in view. The number of standard broadcasting stations has doubled since before the war. More than 350 FM broadcasting stations are on the air, hundreds more are being built. Television is here. New applications for electronics are discovered almost daily in practically every industry. Airplanes are radio and radar equipped. Mobile communications are spreading everywhere. Electronics is moving ahead—**fast.**

Are You Planning Your Future? The time is NOW! Get into this fast growing American industry. Prepare for a secure, well-paid future through CREI, an accredited Technical Institute that starts with fundamentals and can take you all the way to a career. Twenty years of teaching by home study has given CREI the reputation of being one of the leaders in technical radio education. Practical engineers and technicians in hundreds of key positions throughout the field of radio and electronics owe their successful training to CREI. Graduates of CREI are eagerly sought by industry—as large numbers of letters in our "jobs open" and "jobs filled" files prove.

CREI Goes "All The Way" Even though commercial radio may be a new field for you, CREI can **take you all the way.** Military training in radio or radar will help you **but is not essential,** because CREI starts at the beginning. CREI takes you step-by-step through basic levels, into the more advanced study of radio engineering principles and practice. Finally you may elect training at career level in the highly specialized applications of Broadcasting, Television, and Aeronautical Radio.

START NOW—AT HOME —IN YOUR SPARE TIME

An attractive future in this interesting field is within the reach of the man willing to study in his spare time. **Are you that man?** Send for FREE book with complete information and see for yourself. Study the FREE sample lesson you will receive. (For an intelligent answer to your inquiry, please complete coupon in full.)

VETERANS: You can get CREI training at home under the GI BILL.

NON-VETERANS: Easy terms at pre-inflation rates are available.

CAPITOL RADIO ENGINEERING INSTITUTE
Dept. 22, 16th & Park Rd., N.W.
Washington 10, D.C.
Branch Offices:
New York 7: 170 Broadway
San Francisco 2: 760 Market St.

MAIL COUPON FOR FREE BOOKLET AND FREE SAMPLE LESSON

CAPITOL RADIO ENGINEERING INSTITUTE, Dept. 22
16th & Park Road, N. W., Washington 10, D. C.

Gentlemen: Please send me a free sample lesson and your free booklet, "CREI Training For Your Better Job in Radio-Electronics" describing opportunities and CREI home study courses in Radio-Electronics and Television.

NAME .....AGE .....
STREET .....
CITY .....ZONE .....STATE .....
OCCUPATION .....

☐ **I AM ENTITLED TO TRAINING UNDER G. I. BILL**

Check field of greatest interest:
☐ RADIO-ELECTRONICS
☐ BROADCAST AND TELEVISION
☐ AERONAUTICAL RADIO ENGINEERING
☐ RECEIVER SERVICING ☐ INDUST. ELECTRONICS

STUDY AT HOME

With An Educational Institution

Men with specialized training win higher positions, insure larger earnings, and are bigger successes in business and public life. Opportunities NOW greater than ever before. Send for our Catalog.

ARTS and SCIENCES

Courses in Philosophy; Education; Letters; Public Health; Medical Jurisprudence; Psychology; Sociology; Physics; Chemistry; Plastics; Geology; Political Science; Theology; Business and Commerce; Accounting; Mathematics; Statistics; Agriculture.

ENGINEERING

Courses in Electrical, Civil, Mechanical, Drafting, Architectural, Steam, Aeronautical, Radio, Structural, Mining, Industrial, Petroleum, Marine, Chemical, Diesel, Automobile, Refrigeration, and Air Conditioning Engineering.

LAW

Complete Professional Law Course includes 18 Hornbrook Series college grade textbooks. Courses also in Commercial Law, Patent Law and Medical Jurisprudence.

McKinley-Roosevelt Incorporated, 4610-AB, Sheridan Rd., Chicago 40, Ill.

BE A REAL ESTATE BROKER

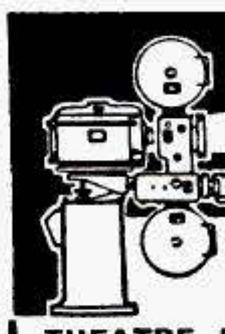
PAYS BIG! **EASY TO LEARN**—Start and run your own business *quickly.* Many graduates report making up to $1000 a month. Course of study covers *Sales, Property Management, Appraising, Loans, Mortgages* and hundreds of related subjects. Course offered in home study or classroom—Both G. I. Approved. ***Send post card today for big, new illustrated book from this nationally known school.*** **Dept. PS**

FREE BOOK TELLS HOW

WEAVER SCHOOL OF REAL ESTATE, 15 E. Pershing Road, Kansas City 8, Mo.

Write Like This

AMAZING DISCOVERY! Corrects poor penmanship in few days —big improvement in three hours, no failures. Complete Outline Free. Write, C. Ozment, 35-D, St. Louis, Mo. IMMEDIATELY.



LEARN MOVIE PROJECTION

THEATRE MANAGEMENT

The Motion Picture Theatre Business offers big opportunities for trained men. Get into a fascinating field with a promising future. Train at home in spare time. Free Catalog. Established 20 years.

THEATRE INSTITUTE, 385 Washington St., Elmira, New York

STAY HOME AND MAKE MONEY!

—Men! Women! Get into profitable, uncrowded profession you can operate from your home or small office after short home training course. No capital required. No goods to buy. No age limit. Others earn $50.00 to $100.00 per week making famous Stephenson corrective foot devices to order. Foot sufferers everywhere pay gladly for relief. Send today for FREE BOOKLET.

STEPHENSON METHOD, Established 1894, 12-62 South Market St., Boston, Mass.

Paint Your Car With Wype For $3.95!

There's no brushing, no masking or spraying. Thousands of car owners are delighted with the results. See your local dealer, department store or order direct. **Wype Corporation, Department 132-B, 2214 Dolman Street, St. Louis 4, Mo.**

RELEASE the Full Power of YOUR MIND

Send for free booklet telling how you can achieve success and reach your personal goals. Find out how to remove frustrations, inferior feelings and worry thru PSYCHO-MENTALISM. Learn how to make your subconscious mind work *for*, not against, you Write today. No obligation. **PSYCHO-MENTALIST INSTITUTE, Administration Building, Dept. 8-B Covina, California**

Now While these Great Industries Go Forward Make Your Decision

AIM HIGH — PICK ONE OF THESE BIG FIELDS

- REFRIGERATION AND AIR CONDITIONING
- AUTOMOTIVE MECHANICS
- BODY, FENDER REBUILDING
- ELECTRICITY
- RADIO
- BUILDING
- DIESEL

For a Better Job or a BUSINESS of YOUR OWN NOW'S the TIME

INDUSTRY is rapidly making up for lost time. There may never again be such opportunities for men who want better jobs or business of their own to get in on ground floor and go up fast! Yes — FOR MEN WHO ACT FAST, THINGS CAN HAPPEN FAST!

YOU CAN'T AFFORD to WAIT YOUR FUTURE DEPENDS on WHAT YOU DO TODAY.

A Few Short Weeks Can Make All the Difference

COMMERCIAL TRADES INSTITUTE was only civilian school selected by Army to train service men for refrigeration. In motive trades our institute gained nation wide fame training Auto Mechanics for U.S. Army. Same quality training available to you now. If over 17 and under 60 learn how you can get started. CONSULTATION AND PLACEMENT SERVICE WHETHER YOU ARE INTERESTED IN WORTHWHILE JOB OR SETTING UP YOUR OWN BUSINESS.

TRAIN AT HOME
IN SPARE TIME OR IN OUR
WELL EQUIPPED SHOPS

REFRIGERATION and AIR CONDITIONING

Trained men paid well to service, install, maintain, repair, rebuild household and commercial refrigerators. Important new developments such as Frozen Foods, and many new industrial uses. Opportunities for full time, spare time earnings. Begin training at home in spare time, finish in our big modern shops, or come directly to shops.

At home you get C.T.I.'s SHOP PROVED HOME STUDY instruction—actual shop experience has gone into the practical lesson assignments. That is why it is easy for mechanically inclined men to learn by our Home Study training, and start on actual refrigeration work.

AUTOMOTIVE MECHANICS · BODY & FENDER REBUILDING

Progress rapid by our learn-by-doing SUPERVISED SHOP TRAINING. Efficient auto mechanics get excellent pay. Learn to overhaul and repair engines, transmissions, differentials and other assemblies.

Body and Fender Rebuilding offers profitable work. Get good, practical "all-around" training—welding, aligning, mixing and matching colors, spray painting, power and hand tools. Values increased when used cars are made to "look like new."

RADIO SERVICING

Vastly increased number of radio receivers, development of FM broadcasting, installation of public address systems, demand services of trained men who can repair receiving sets, install p.a. equipment. Men who can quickly, efficiently service receiving sets earn good pay, have excellent opportunities to start own business. Get practical training in the big C.T.I. shops. Learn Radio Servicing — pay is good!

ELECTRICITY — ELECTRICAL SERVICING

Get ready for good job or business of your own. Electricity is the heart of modern industry. Electricians always needed, earn higher pay, work year around. Make rapid progress in step-by-step practical shop training in Electrical Wiring and Circuits; Armature Winding; Electrical Appliance Repairs; Electro Plating and Welding, Rural Electrification, the Building Boom, many new uses of Electricity opening more opportunities in this vast field. Get training under thoroughly experienced instructors, be ready in few short weeks for Job Opportunities in Electricity.

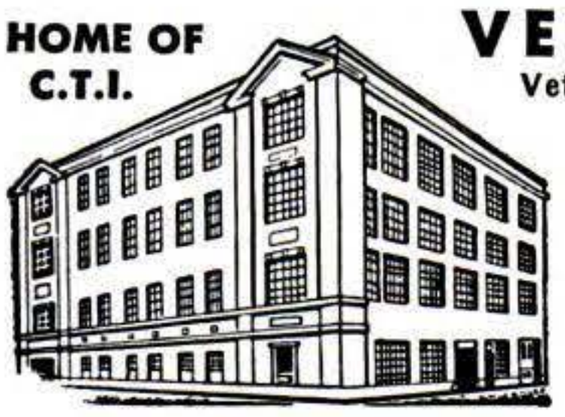
DIESEL

Diesel engines are used to power entire fleets of trucks and buses, to drive tractors and other farm equipment. Diesels have revolutionized the railroads, are employed for passenger and freight trains as well as for switching engines. They are used to power road equipment, and even are being tested for airplanes and passenger cars. A big field that promises even bigger things in the years right ahead. Modern shop training on actual equipment under experienced instructors. Learn Diesel under direction of men who trained Diesel mechanics for U. S. Army.

BUILDING CONSTRUCTION

Do you want to be on the inside in the building boom — where big money is made? Learn about opportunities for building contractors whether or not you have previous experience in this field. Millions of dollars are going to be made in home and farm buildings, in construction of stores, garages, small industrial buildings. Building industry uses men by thousands in construction, supervision, management, sales.

HOME OF C.T.I.



VETERANS—

Veterans qualifying under "G.I. Bill" have tuition paid by Government plus monthly subsistence allowance while in school. Just mail coupon, we will handle all details. (LOW TUITION, EASY TERMS if you are not a veteran.)

COMMERCIAL TRADES INSTITUTE, Dept. EI-2
1400 GREENLEAF AVENUE CHICAGO 26, ILLINOIS

Fill Out, Cut Out, Mail Today

COMMERCIAL TRADES INSTITUTE, Dept. EI-2
1400 W. Greenleaf, Chicago 26, Ill.

Send free illustrated Brochures and other information about the field I have checked below.

☐ Refrigeration and Air Conditioning ☐ Automotive Mechanics
☐ Electricity ☐ Diesel Mechanics ☐ Body & Fender Rebuilding
☐ Radio Servicing ☐ Building Construction

Name_____

Address_____

City_____ State_____

☐ Veteran ☐ Non-Veteran

Copyrighted material

Put your future in your own hands

BE AN ARTIST

Here's the Amazing Way We Teach You Step-by-Step to Draw At Home in Spare Time

Draw for money. Prepare yourself now for a fascinating, pleasant and profitable Art Career. COMMERCIAL ART, DESIGNING, CARTOONING—all in one complete home study course. No previous art experience necessary. We teach you step-by-step and prepare you for good jobs in advertising, newspaper and magazine publishing, department stores, printers, engravers, or in art studios where you can become your own boss. For 34 years our graduates have been "making good"—WHY NOT YOU?

Trained Artists Are Capable of Earning

$50 - $60 - $75 and MORE a WEEK

Write for FREE BOOK, "Art for Pleasure & Profit"—tells about our course, instruction service, material furnished, what our graduates say, and commercial opportunities for you. TWO ART OUTFITS and other features included with training.

Veterans! Course "G.I." Approved

FREE BOOK gives details!

Washington School of Art, Studio 132M
1115—15th St., N.W., Washington 5, D. C.
Please send me full information and your Free Book, "Art for Pleasure and Profit."

Name.....AGE.....
Street.....
City.....Zone...State.....

☐ **I am entitled to training under the GI Bill**

SEND FOR THIS FREE!

Make money with horses. Every farmer, every lover of horseflesh should have a copy of this booklet. If you want to know how to break, train and make money with horses, *write today for full information FREE*, together with my special offer of a course in Animal Breeding. If you are interested in Gaiting and Riding the saddle horse check here. ☐ *Do it today—now. You'll never regret it.*

BEERY SCHOOL OF HORSEMANSHIP
Dept. 582 **Pleasant Hill, Ohio**

Practical Shop Training In REFRIGERATION

Service, Maintenance, Installation and AIR CONDITIONING

• Domestic • Commercial • Industrial

Approved for G. I. Training

Write for Details
COMMERCIAL TRADES INSTITUTE
202 So. 20th St., Birmingham, Ala.
. . Train in the Magic City of the South. .

HEADPHONES

(Army HS-23) 8000 ohms. Leather covered, adjustable. With 18" double cord and PL-354 plug.....$1.25
RUBBER PHONE CUSHIONS. Per pair... .20
HEADBAND (HB-7) only..... .39

!!SPECIAL!!—GIANT "GRAB-BAG" RADIO PARTS KIT. A real buy for the RADIO AMATEUR, BUILDER AND EXPERIMENTER in new and dismantled parts. **17 FULL POUNDS of RESISTORS, CONDENSERS, WIRE, HARDWARE, COILS, SOCKETS, ETC., ETC. All for.....$2.95**

6V. TELEGRAPH KEY AND BUZZER (Western Electric). Fully adj. key, platinum contacts. 1/4" bakelite base.....$1.25
Key only..... .49
Variety of powerful ALNICO MAGNETS in stock. Write for supplement. GET ON OUR MAILING LIST—ALWAYS SOMETHING NEW. PLEASE ADD SUFFICIENT POSTAGE.

LEOTONE RADIO CO., 65 Dey St., New York 7, N. Y.

HELP FOR INVENTORS

Hundreds of manufacturers have requested our assistance in locating marketable new products.

Complete information, free.

INSTITUTE of AMERICAN INVENTORS
Dept. 3, 1926 Eye St. N.W., Washington 6, D. C.

INVENTORS

Whether an invention is patentable can be substantially determined by a search of the U. S. Patent records. Without obligation, write for information explaining the steps you should take to secure a patent.

JOHN N. RANDOLPH
Registered Patent Attorney
205 Columbian Building, Washington 1, D. C.

PATENTS AND TRADE MARKS

C. A. SNOW & CO.
REGISTERED PATENT ATTORNEYS
WRITE FOR INFORMATION TO
246 SNOW BUILDING, WASHINGTON 1, D. C.

INVENTORS

IF YOU WISH TO PROTECT YOUR INVENTION,
You should take steps to protect it by a U. S. Patent. Write me for "Record of Invention" form.

CARL MILLER
REGISTERED PATENT ATTORNEY

Woolworth Bldg., 35th Floor, Dept. 28-C, New York City
Please send me "Record of Invention" form.

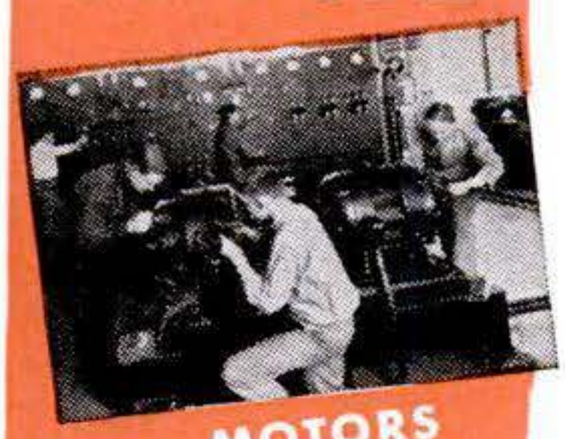
NAME.....

ADDRESS

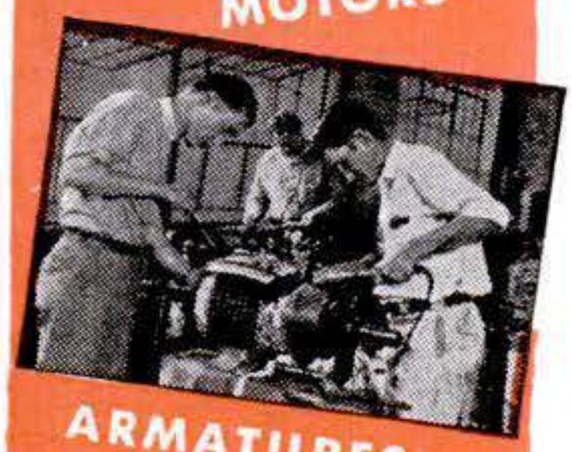
Copyrighted material

Learn ELECTRICITY in the GREAT SHOPS OF COYNE

ACTUAL SHOP SCENES AT COYNE



MOTORS



ARMATURES

REFRIGERATION

LIGHTING

NOT A "HOME-STUDY COURSE"

B. W. COOKE

For nearly 50 years, the Great Shops of COYNE in Chicago have been training men to step into the better-paying jobs in ELECTRICITY. Here in just a few short weeks YOU can quickly prepare for amazing opportunities.

As a Coyne student you work on real equipment — just like you'll use later on the job. We do not teach by mail. You get actual shop work plus necessary theory. Coyne training is practical. You make rapid progress at COYNE because it's a shop course.

GET ALL-AROUND TRAINING . . . . in a Few Short Weeks

Why be satisfied with a "one-operation" job? At Coyne you learn Motors, Armature Winding, House and Factory Wiring, Appliances, Power Plant Work, Illumination, Electrical Maintenance—plus the fast-growing branch of Industrial Electronics. Whether you're experienced or not, we train you for a good job, then help you get it! Coyne graduates may use our Lifetime Employment Service as often as they wish.

INDUSTRIAL ELECTRONICS and REFRIGERATION Included

Added training in Electric Refrigeration—principles, testing, repairing—is included with this course. Industrial Electronics given as part of our "all-around" Electrical Training.

VETERANS! Coyne is authorized to accept veterans for G. I. Training. Coupon brings special G. I. Bulletin.

NON-VETERANS who are short of cash can finance most of their tuition and pay it in easy monthly payments after graduation.

ANY MAN WITH A PHYSICAL DISABILITY whether a Veteran or not may qualify for Coyne training at no cost to himself for tuition or subsistence. Mail coupon for details.

MAIL COUPON for Big FREE Book

Find out NOW what **Coyne** offers in training for your future. Coupon brings big book filled with fascinating pictures of our great shops and our plans to help YOU. Get your copy FREE. No cost or obligation, and no salesman will call. Rush the coupon TODAY.

B. W. Cooke, President,
COYNE ELECTRICAL SCHOOL, Dept. 28-73,
500 S. Paulina St., Chicago 12, Ill.

Send me your Free Book and tell me about your plans to help me—including Student Fianance and added Training in Industrial Electronics and Electric Refrigeration.

NAME.....

ADDRESS.....

CITY.....STATE.....

COYNE
ELECTRICAL SCHOOL
500 S. Paulina St.,
Dept. 28-73,
Chicago 12, Illinois

ESTABLISHED 1899

Copyrighted material

INVENTORS

When you are satisfied that you have invented a matter of value—write me, without obligation, for full information as to what steps you should take to secure a Patent or Trademark.

The usual first step is to have a search of the prior U. S Patents conducted, so that I can report to you on the question of Patentability.

PATRICK D. BEAVERS
(Formerly RANDOLPH & BEAVERS)
Registered Patent Attorney
937 Columbian Building, Washington 1, D. C.

PATRICK D. BEAVERS, *Registered Patent Atty.*
937 Columbian Bldg., Washington 1, D. C.

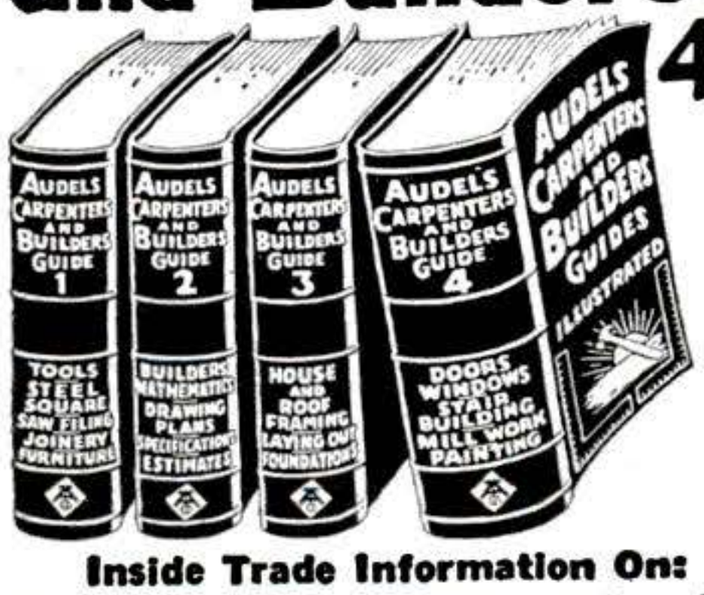
Please send me full information on how to secure Patents & Trademarks.

Name.....

Street.....

City..... *State*.....

AUDELS Carpenters and Builders Guides



4 vols. $6

Inside Trade Information for Carpenters, Builders, Joiners, Building Mechanics and all Woodworkers. These Guides give you the short-cut instructions that you want—including new methods, ideas, solutions, plans, systems and money saving suggestions. An easy progressive course for the apprentice and student. A practical daily helper and Quick Reference for the master worker. Carpenters everywhere are using these Guides as a Helping Hand to Easier Work, Better Work and Better Pay. To get this assistance for yourself, simply fill in and mail the FREE COUPON below.

Inside Trade Information On:

How to use the steel square—How to file and set saws—How to build furniture—How to use a mitre box—How to use the chalk line—How to use rules and scales—How to make joints—Carpenters arithmetic—Solving mensuration problems—Estimating strength of timbers—How to set girders and sills—How to frame houses and roofs—How to estimate costs—How to build houses, barns, garages, bungalows, etc.—How to read and draw plans—Drawing up specifications—How to excavate—How to use settings 12, 13 and 17 on the steel square—How to build hoists and scaffolds—skylights—How to build stairs—How to put on interior trim—How to hang doors—How to lath—lay floors—How to paint

AUDEL, Publishers, 49 W. 23rd St., New York 10, N. Y.

Mail Audels Carpenters and Builders Guides, 4 vols., on 7 days free trial. If OK I will remit $1 in 7 days and $1 monthly until $6 is paid. Otherwise I will return them. No obligation unless I am satisfied.

Name_____

Address_____

Occupation_____

Employed by_____ P. S. M.

LEARN AT HOME TO MOUNT BIRDS

Animals, Heads, Fishes, Pets; to TAN.
Be a Taxidermist. Profit and FUN.

Hunters, save your valuable **TROPHIES.** Mount ducks, squirrels, everything. Learn to **TAN** for leather and furs. Wonderful **HOBBY** Have a **HOME MUSEUM.**—**BIG PROFITS** mounting for others. **INVESTIGATE NOW.**

FREE BOOK With 100 fine game pictures. **NOW** absolutely **FREE. Write TODAY.**

Send Postal TODAY for FREE BOOK. State AGE.
N. W. SCHOOL OF TAXIDERMY, Dept. 3392, Omaha, Neb.

LAW FREE BOOK

Write today for FREE 48-page book, **"THE LAW-TRAINED MAN,"** which shows how to learn law easily in spare time at home through the Blackstone course prepared by 60 well-known law authorities. We furnish all material including 18-volume Modern American Law library. Many successful attorneys among our graduates. LL.B. degree. Moderate cost; easy terms; Money-Back Agreement.

BLACKSTONE COLLEGE OF LAW
225 N. Michigan Ave., Dept. 122, Chicago 1, Ill.
A Correspondence Institution Founded in 1890

MEN'S SLACKS **$ SAVE $** **BUFFALO PLAID SHIRTS**

On New Merchandise and Order by Mail

80% Wool, Dark Brown Only. Sizes 29 to 36. Add 25c P. P. Ins.

All Wool, Colors Black & Red, Black & Grey. Sizes Small, Medium, Large. Add 25c P. P. Ins.

$6.95 Retail Value $10.95

Broadway Mail Order Co.
1205 Broadway, New York 1, N. Y.
Mail Orders Promptly Filled. Please Include Postage With Order. Write For Circular.

$6.75 Retail Value $11.95

Thrilling Work COLORING PHOTOS

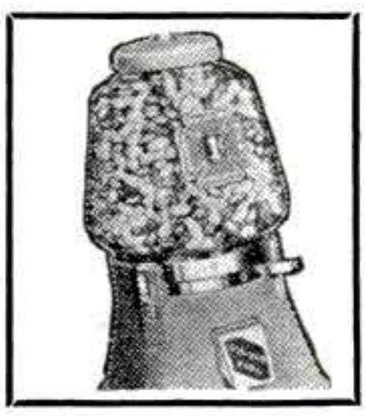
Fascinating vocation learned at home by those with aptitude. Thrilling pastime. National method brings out life-like colors. Free booklet.
NATIONAL PHOTO COLORING SCHOOL
1315 S. Michigan, Dept. 1362, Chicago 5

MONEY for MEN ALL DATA FREE

THE PLASTEX Industry needs manufacturers on small scale and for big production of Lamp and Clock Stands, Art Goods and Novelties in Plastex and Marble imitation. Experience unnecessary. ½c material makes regular 10c store sellers. Rubber moulds furnished for speed production. Small investment brings good returns. Big chain store orders now being placed. Ambitious men have chance for real prosperity. Our Free booklet will interest and benefit you.

PLASTEX INDUSTRIES, Dept. 2, 3400 Third Ave., New York 56, N. Y.

START BUSINESS FOR YOURSELF



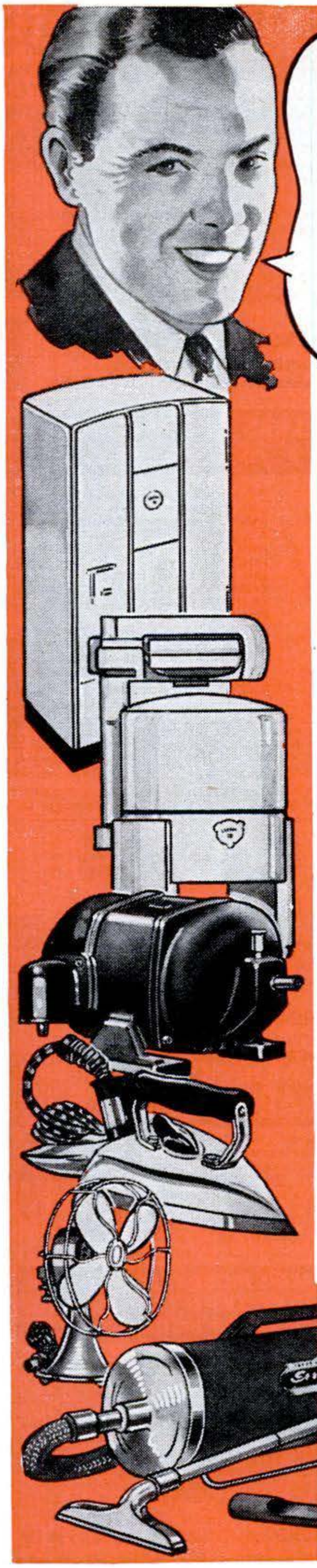
Own-operate Silver King Bubbleball Gum Vending machine in any retail store. Gum 40c per lb. Globe capacity 6 lbs. 140 balls to the lb. You pay the storekeeper 20% of the gross and you will have a profit of $4.30 per refill.

$13.95 EACH

Send ⅓ Deposit on Orders, Balance C.O.D.

CAMEO VENDING
DISTRIBUTORS — DEPT. A1
432 West 42 Street New York 18, N. Y.

Copyrighted material



BIG MONEY INDEPENDENCE

A PROFITABLE LIFETIME BUSINESS OF YOUR OWN!

LEARN ELECTRICAL APPLIANCE REPAIRING

PREPARE NOW FOR THE FUTURE

If now employed, start your home appliance repair business NOW in your spare time and be set with a business of your own no matter what happens. You don't need elaborate fixtures or expensive equipment to be a successful repairman. Operate from your garage, basement, vacant store, etc. Work as many hours as you wish—the home appliance repairman is his own boss. It is a profitable occupation for on many types of repairs it is not unusual for a repairman to charge on the basis of $5.00 to $6.00 per hour. Don't gamble with your future—learn a trade that will always support you. Remember, as long as electrical appliances are used, there will be a need for electrical appliance repairmen.

If you are at all mechanically inclined—can hold and use tools—then you have all of the qualifications required for becoming a big money earning home appliance repairman. It does not matter if you have not had a great deal of schooling or had previous experience along these lines—WE WILL TEACH YOU. Age should be no barrier—nor should any minor physical handicap.

New Course Tells All

Profusely illustrated, our new course shows you in simple, easy to understand language and drawings how to make each repair on refrigerators, vacuum cleaners, washing machines, motors, etc. Explains and gives you a working knowledge of electricity, welding, nickel plating, etc. Shows you how to build the power tools you need and how to solicit and keep business coming to you. Not a theory course but an honest to goodness course written by and used by repairmen the country over. Price of course is so low that the savings on your own household appliance repairs will quickly pay for it. Act now! Mail the handy coupon below today.

Read What Our Students Say About Course

I really believe your course the best investment a mechanically minded man can make.—Claude E. Allen, Indianapolis, Ind.

I have received your Course in Appliance Repairing and I must say I am well pleased with same. I am only sorry I did not have said Course some years ago. I have learned so much more through this course I would not part with it.—Charles Schwarz, Hamilton, Ohio.

The Course in Appliance Servicing arrived a few days ago. Want to take out a few minutes of my valuable time to let you know that this is just what I have been looking for ever since I opened up my Fix-It shop. I must admit that you told the truth when you said that it contains quite a bit more information than I bargained for. — P. J. Bretl, Sebring, Ohio.

I am a mechanic for the Western Union Telegraph Co. Three days after receiving the lessons in refrigeration I earned the exact cost of the course. —Henry S. Lee, Washington, D. C.

I work day times at the shipyard and after 4:00 P.M. I operate from my cellar and garage. I average $10.00 to $15.00 clear every day.—Walter Hanby, Brockton, Mass.

GET STARTED TODAY—MAIL THIS COUPON

CHRISTY SUPPLY CO.
2835 N. Central Ave., Dept. D-6101
Chicago 34, Illinois

Please send me free illustrated literature about America's Fastest Growing Industry—ELECTRICAL APPLIANCE REPAIRING.

Name.....

Address.....

City.....State.....

Copyrighted material

Learn ELECTRIC MOTOR REPAIR!

FIX ANY KIND—ANY TYPE—LEARN AT HOME—*Only* $5

Based on what can quickly be learned from this 580-page book—for only $5, complete—you can prepare for fast service on practically any electric motor in common use! Up to now, there has been no easy way to learn this profitable trade. ELECTRIC MOTOR REPAIR book helps you do it—*in a few short weeks!*

Train for Good Pay in a Wide Open Field!

All types of electric motor work are covered fully—from simple repairs and adjustments to complete rewindings. Quick reference guides show exactly how to handle specific jobs. Everything explained clearly as A-B-C by text and more than 900 illustrations.

GET WHERE THE BIG MONEY IS!

There are more motors than any other type of appliance. Almost every home has from 6 to 25—in clocks, washers, phonographs, fans, refrigerators, oil burners, mixers, shavers, etc. Millions more in offices and factories. Be the well-paid expert who can keep them working!

5-DAY MONEY-BACK GUARANTEE!

Dept. PS-28, MURRAY HILL BOOKS, INC., 232 Madison Ave., New York 16, N. Y.

Enclosed find $5 ($5.50 foreign) for my copy of **ELECTRIC MOTOR REPAIR** book; or send C.O.D. for this amount plus postage. It is understood I may return book in 5 days if not satisfactory and have my money refunded.

Name.....

Address.....

City & Dist. No.....State.....

Learn this Profitable Profession

IN 90 DAYS AT HOME

Money-Making Career Open to Men and Women, 18 to 50

Hundreds of men and women between 18 and 50 make $10 to $20 in a single day giving scientific Swedish Massage and Hydro-Therapy treatments. There is big demand from doctors, hospitals, sanatoriums and clubs. Graduates earn large full time incomes from these or in private practice in their own offices. Others make good money from home treatments given in spare time. Learn this interesting, money-making profession in your own home, through our home study course. Same instructors as in our **nationally known** resident school. **You** can win independence and prepare for future security by qualifying for your Diploma. Course can be completed in 3 to 4 months. Many earn while they learn. Begin **your** training at once.

Anatomy Charts & Booklet FREE

Enroll now and we will include, at no extra cost, many needed supplies. Fit yourself to help meet growing demand for Scientific Swedish Massage. **Send the coupon at once for complete details, Anatomy Charts and 32-Page Illustrated Booklet, FREE, postpaid.**

THE COLLEGE OF SWEDISH MASSAGE
Dept. 870-B, 100 East Ohio St., Chicago 11, Illinois

Please send me FREE and postpaid, Anatomy Charts, 32-page Booklet and complete details on Home Training.

Name.....

Address.....

City.....State.....

HOME-STUDY BRINGS BIGGER PAY

Don't be caught napping when Opportunity knocks. Prepare for advancement and more money by training *now* for the job ahead. *Free 48-Page Books Tell How.* Write for the book on the business field you like—or mail us this ad with your name and address in the margin. *Now*, please.

- ☐ Higher Accountancy
- ☐ Business Management
- ☐ Traffic Management
- ☐ Salesmanship
- ☐ Law—Degree of LL.B.
- ☐ Expert Bookkeeping
- ☐ Industrial Management
- ☐ C.P.A. Coaching
- ☐ Stenotypy (Machine Shorthand)

LASALLE EXTENSION UNIVERSITY
A Correspondence Institution
Dept. 283-R, 417 So. Dearborn St. Chicago 5, Ill.

PRECISION JEWELERS SCREW DRIVERS

Complete Set of 8 for Every "Hobbyist"

At last—a complete set of precision screw drivers to meet the needs of every model builder. Not a miniature but the same type set used by U. S. Navy for precision instruments and watches during the war. Brass knurled handles, hexagon heads, finest tempered steel blades. Sizes 2-9. Never before a set of this quality and precision at such a low price. Your money back if not satisfied. C.O.D. $2.00 plus postage or send $2.00 and we pay postage.

PINE WATCH CO., Rm. 40, 29 Eldridge St., New York 2, N. Y.

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 39 years expert instruction—over 108,000 students enrolled. LL.B. Degree awarded. All texts furnished. Easy payments. G.I. Approved. Send for FREE BOOK.

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 86-S, 646 N. Michigan Ave., Chicago, Ill.

ZIRCONS

Loose. Pure white.

SPECIAL: 3 Zircons approximate total weight 3-kts. $3.00. We can supply Zircons in all sizes and mountings of all types. Send order or write for details today.

B. LOWE, Holland Bldg., Dept. PS, St. Louis, Mo.

BIG 3½-POWER BINOCULARS only 2.98

Quality plus—yet priced to beat all competition. All metal with adjustable focusing wheel and shoulder strap. Tubes extend for sharp, instant view of distant objects. SEND NO MONEY! Clip ad and mail. We'll ship C.O.D. Check here to get handsome Carry Case only 50c extra. ☐

Illinois Merchandise Mart, Dept. 2224
1227 Loyola Ave., Chicago 26, Ill.

Enjoy —WORLD'S MOST FASCINATING HOBBY! SEND FOR FULLY ILLUSTRATED BOOK TODAY!

GET THE FACTS on model railroading! Learn how easily you can enjoy the favorite hobby of thousands of mechanics, business and professional men. Endlessly fascinating... scale model railroads look, perform amazingly like the real thing!

BOOK SHOWS HOW to get started. Leading authority gives easy steps in complete, 32-page beginner's manual. Profusely illustrated with photos, diagrams. Send 10c, coin or stamps, today! Address

MODEL RAILROADER MAGAZINE
Dept. 1614, Milwaukee 3, Wis.

Copyrighted material

THOUSANDS NOW PLAY

who never thought they could!

Thrilled by Playing

I've had my lessons just a week. I think your course is super. I was more thrilled than words can express when I found I could actually play America, The Merry Widow Waltz and the others.
*J. T., Mancelona, Mich.

Wouldn't Take $1000 for Course

The lessons are so simple that anyone can understand them. I have learned to play by note in a little more than a month. I wouldn't take a thousand dollars for my course. *S. E. A., Kansas City, Mo.

Shares Course With Sister

The teaching is so interesting and the pieces so beautiful I couldn't ask for anything better. I recommend your course highly. My sister shares it with me and feels the same way. *D. E. G., Wausau, Wisc.

Finding New Joy

I am finding a new joy that I never experienced before, for I have always wanted to play, but had given up hope until I heard of your course.
*C. S., Lucien, Okla.

Plays After 2 Months

I hesitated before sending for your course because of an earlier experience I had with a course by ear from another company. I am playing pieces now I never dreamed I would play after only two months.
*E. T., Prichard, Ala.

*Actual pupils' names on request. Pictures by professional models.

You, too, can play any instrument By this EASY A-B-C Method

YOU think it's difficult to learn music? That's what thousands of others have thought! Just like you, they long to play some instrument — the piano, violin, guitar, saxophone or other favorites. But they denied themselves the pleasure — because they thought it took months and years of tedious study to learn.

Learn in Spare Time at Home

And then they made an amazing discovery! They learned about a wonderful way to learn music at home — without a private teacher — without tedious study — and in a surprisingly short time. They wrote to the U. S. School of Music for the facts about this remarkable short-cut method. And the facts opened their eyes! They were amazed to find how easy it was to learn.

The result? Over 850,000 men and women have studied music at home this simple, A-B-C way. Now, all over the world, enthusiastic music-lovers are enjoying the thrilling satisfaction of creating their own music. They have found the key to good time, popularity and profit.

Costs Only Few Cents a Day

And that's what **you** can do, right now. Get the proof that you, too, can learn to play your favorite instrument — quickly, easily, in spare time at home for only a few cents a day. Never mind if you have no musical knowledge, training or talent. Just read the fascinating booklet and Print and Picture sample that fully explain all about the famous U. S. School method. If interested tear out the coupon now, before you turn the page. U. S. School of Music, 82 Brunswick Bldg., New York 10, N. Y. Largest school of its kind in the world. (50th year)

FREE!
Print and Picture Sample

NOTICE
Please don't confuse our method with any systems claiming to teach "without music" or "by ear." We teach you easily and quickly to play **real music,** any music, by standard notes . . . not by any trick or number system.

U. S. SCHOOL OF MUSIC,
82 Brunswick Bldg., New York 10, N. Y.

I am interested in music study, particularly in the instrument checked below. Please send me your free illustrated booklet "How to Learn Music at Home," and your free Print and Picture Sample. (Instrument supplied when needed, cash or credit.)

Piano	Saxophone	Clarinet	Practical Finger Control
Guitar	Trumpet, Cornet	Trombone	Piccolo
Hawaiian Guitar	Reed Organ	Flute	Mandolin
Violin	Tenor Banjo	Modern Elementary Harmony	
Piano Accordion	Ukulele		

Name_____ Have you Instrument?_____
(Please print)

Address_____

City_____ State_____

NOTE: If you are under 16 years of age, parent must sign coupon.

SAVE 2c — STICK COUPON ON PENNY POSTCARD

Copyrighted material

NOW! ALL 5 FAMOUS JOWETT COURSES IN 1 COMPLETE MUSCLE BUILDING VOLUME! FOR ONLY 25¢ AND MY PHOTO BOOK OF FAMOUS STRONG MEN! FREE!

COMMANDO-TOUGH
OR IT WON'T COST YOU A CENT!
says George F. Jowett WORLD'S GREATEST BODY BUILDER

GIVE ME 10 MINUTES A DAY
Learn My Time Tested Secrets Of Strength

I'll teach you the "Progressive Power Method" through which I rebuilt myself from a physical wreck the doctors condemned to die at 15, to the holder of more strength records than any other living athlete or teacher! "Progressive Power" has proven its ability to build the strongest, handsomest men in the world. And I stand ready to show you on a money back basis—that no matter how flabby or puny you are I can do the same for you right in your own home. Let me prove I can add inches to your arms, broaden your shoulders, give you a man-sized chest, powerful legs and a Rock-like back—in fact, power pack your whole body so quickly it will amaze you! Through my proven secrets I bring to life new power in you inside and out, until YOU are fully satisfied you are the man you want to be.

PROVE IT TO YOURSELF IN ONE NIGHT

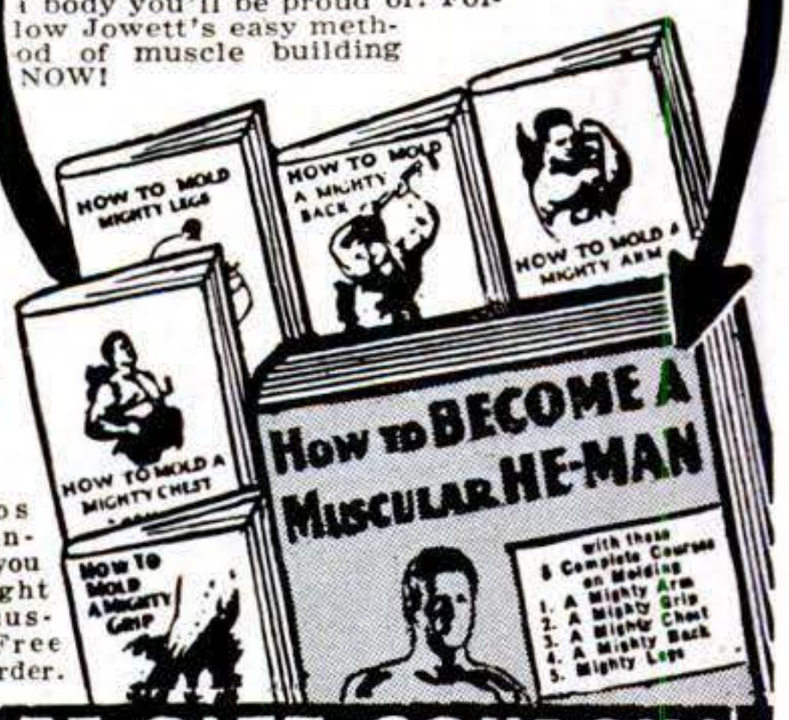
Send only 25c for my 5 easy-to-follow, picture-packed courses now in 1 complete volume "How to Become a Muscular He-Man." Try it for one night! Experience the thrilling strength that surges through your muscles.

10 DAY TRIAL!

Think of it—all five of these famous courses now in one picture-packed volume for only 25c. If you're not delighted with this famous muscle-building guide – if you don't actually FEEL results within ONE WEEK, send it back and your money will be promptly refunded!

I am making a drive for thousands of new friends fast —REGARDLESS OF COST!
SO GET NOW MY 5 Muscle Building COURSES
(Valued at $5 each)
All in 1 Great Complete Volume
Packed With How-To-Do-It Pictures!
Now, this "get-acquainted," extremely low price of only 25c is your chance to build a body you'll be proud of! Follow Jowett's easy method of muscle building NOW!
For Only 25c

PHOTO BOOK OF FAMOUS STRONG MEN!



FREE!

Photos that inspire you to might and muscle. Free with order.

FREE GIFT COUPON!

George F. Jowett Champion of Champions

Jowett Institute of Physical Culture Dept. PS-82
230 Fifth Avenue, New York 1, N. Y.

George F. Jowett:—Please send by return mail, prepaid, FREE Jowett's Photo Book of Strong Men, along with all 5 Muscle Building Courses. 1. Molding a Mighty Chest. 2. Molding a Mighty Arm. 3. Molding a Mighty Grip. 4. Molding a Mighty Back. 5. Molding Mighty Legs—Now all in One Volume "How to Become a Muscular He-Man." Enclosed find 25c. NO C.O.D.'S.

NAME..... AGE.....
(Please Print Plainly, Include Zone Number)

ADDRESS.....

Do You Make These Mistakes in English?

MANY persons say "between you and I" instead of "between you and me"—or use "who" for "whom"—or don't know whether to spell certain words with one or two "c's" or "m's" or "r's," or with "ie," or "ei," etc. Every time you speak or write you show what you are. Mistakes in English reveal lack of education, refinement. Lack of language power prevents you from presenting your thoughts in the strongest way. Real command of English will help you reach ANY goal. Stop making mistakes in spelling, punctuation, pronunciation, grammar. Increase your vocabulary.

Sherwin Cody

WONDERFUL INVENTION

Only 15 minutes a day with Sherwin Cody's new invention—and you can actually SEE your English improve. It teaches by HABIT—makes it easier to do the RIGHT way. Wonderful self-correcting lessons.

FREE BOOK ON ENGLISH Lack of language power may be costing you friendships, income, every year. See what Mr. Cody can do for you; it costs nothing to find out. Write this very minute for free book. "How You Can Master Good English in 15 Minutes a Day." It will prove a revelation. WRITE NOW. Sherwin Cody School of English, 182 B & O Bldg., Rochester 4, N. Y.

ANALYZE Handwriting

Uncrowded, fascinating field. Gratifying earnings reported by graduates in Employment, Credit, Social Service, Police and Entertainment fields. Others have developed profitable private practice, full or spare time, as Personal Problem and Vocational Counselors. Send for 3000 word TEST LESSON and Grapho Analyst FREE.

FREE BOOK and LESSON

A. I. G. A. Inc., Wilhoit Bldg., Dept. 126, Springfield, Mo.

LEARN WATCH and CLOCK REPAIRING

Start training now for a better paying job or your own profitable business. Qualified Watch Makers are in demand . . . Unlimited opportunities. Intensive practical training by experienced watch makers. Veteran operated. Write for full details. Indicate if Veteran.

SCIENTIFIC SCHOOL OF WATCH MAKING, Dept. PS-2
3923 San Fernando Road Glendale 4, Calif.

FIX SEWING MACHINES

BIG MONEY. Spare or full time. Open your own neighborhood shop. Thousands need repairs. Send for complete Repair Manual—only $1.98 postpaid. Money back guarantee.

SEWING MACHINE SERVICE CO. Hamilton 26-K, Ohio.

DEVELOP RUGGED STRENGTH!

Strong Men's Club of America offers FREE Membership!

Send for your personal membership card and Strength Secrets. No dues! No obligations! Many valuable privileges! Send name, address, age, on penny postcard.

JOE BONOMO Strong Men's Club of America
Director (Dept. PS-2) 1841 Broadway, N. Y. 23, N. Y.

HYPNOTISM

Learn to hypnotize. Self-hypnosis. Secrets revealed. Exciting experiments. Overcome inferiority complexes, excessive smoking, alcoholism, stuttering, nailbiting, phobias, insomnia, fear, manias, stagefright. Improve your memory and concentration. Private and class instruction available at Institute. Complete practical home-study course. . . . $2

POWERS INSTITUTE OF HYPNOTISM 1324 Wilshire Blvd. Dept. 26, Los Angeles 14, Calif.

Learn BAKING At Home

Baking is one of America's high industries in wages. Nearly depression-proof. Thorough basic home course lays sound foundation. If you have aptitude, write for FREE BOOKLET, "Opportunities in Commercial Baking."

National Baking School, 1315 Mich. Ave., Dept. 1362, Chicago 5

3 In 1 AIR PISTOL

SPORTSMAN JR.—Sensational, low-priced air pistol. Ruggedly built, full size target gun shoots either standard BBs, pellets or steel darts. Fast, single-action compression chamber. Single shot, silent shooting. Use indoors or outdoors. Modeled after famous target pistol Economical to operate. Die cast all metal non-slip moulded grip; machined steel chamber and barrel. 8-in. long; 4½-in. deep; full size, weighs 15 oz. EACH $3.49

BBs, 3 pkgs. 25c; .177 pellets, 500 for $1.50; steel darts, 35c package. (Holster 50c) Order Plenty.

No C.O.D.
JOHNSON SMITH & COMPANY, Dept. B-73, Detroit 7, Michigan

Copyrighted material

DO ANY JOB.. EASIER.. QUICKER
MAKE MORE MONEY *in the*
BIG OPPORTUNITY FIELDS

SEND NO MONEY
Select the Books YOU Need Now! We Ship C.O.D. Anywhere in U. S. and Will Refund Amount Paid if Not Satisfactory.

Here's the Help You Need For Best Paying Jobs Right NOW!

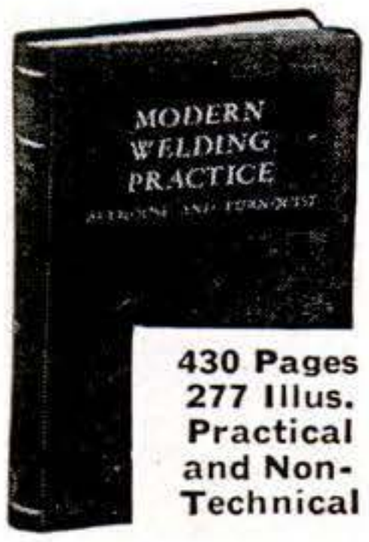
FREE TRIAL IN YOUR OWN HOME

Used by Army, Navy, Other Government Depts., 200 Schools and Industrial Firms.

Do it now! Get the better pay that goes to men with specialized knowledge. Get into one of these big opportunity fields. Big money and many other advantages await you if you prepare now. Here is the help you need—EASY—QUICK—AT LOW COST. Thousands of men have already used these famous books. Beginners and experienced men alike have doubled and tripled their earnings with this help. You too, can now get the special knowledge you need for top pay, better jobs, or a business of your own. This is your GOLDEN OPPORTUNITY.

AIR CONDITIONING

Big air conditioning boom interrupted by war now bigger than ever and alive with new opportunities! Get this non-technical book by international authority and be ready for your share of millions to be spent. Covers whole field. 450 pages. Illustrated. $4.00.



MODERN WELDING PRACTICE

430 Pages 277 Illus. Practical and Non-Technical

Newest book on all types of welding and heattreatment of metals. Written by recognized specialists in training men for production jobs. **Practical and Non-Technical.** Covers everything you need to know. Prepare for best pay jobs now. Price $4.00.

SHEET METAL LAYOUT

Makes sheet metal layout work so simple that anyone can learn. Get this new instructor and get into the easiest, cleanest and best paying part of all sheet metal work. 143 jobs worked out in drawings and carefully explained. Gives standard for all sheet metal fittings. $3.50.

HOUSE WIRING
LATEST EDITION

Get this sixth edition of this standard and practical electrical wiring book. It gives complete practical instruction on every phase of house wiring in one handy volume. Goes further than most books on subject. Hand-book style. Gives National Electric Code. 400 pages, 669 illustrations. Electrical work will reach a new high with millions of new homes to be built. Get started now. $3.00.

DYKE'S FAMOUS CARBURETOR BOOK

This famous book has been the standard guide in the best paying auto work for a generation. It has helped thousands of men make money. New edition covers engine tune-up, compression, ignition, carburetion, fuel pump valves, etc. Use this book to specialize in this big field. 244 pages, 549 illustrations. $3.50.

AUTO BODY and FENDER REPAIR

Owners will spend big money to keep their good older cars looking like the new ones coming out. This is a practical money-making guide, ideal for shop owners and every man who wants a share of the millions to be spent in keeping old cars looking new. Tells how to get a good job or start business of your own with small capital. 325 pages, 232 illustrations. $3.50.

BIG 20th EDITION

Leading Auto Book for Over 36 Years

World's Greatest AUTO BOOK

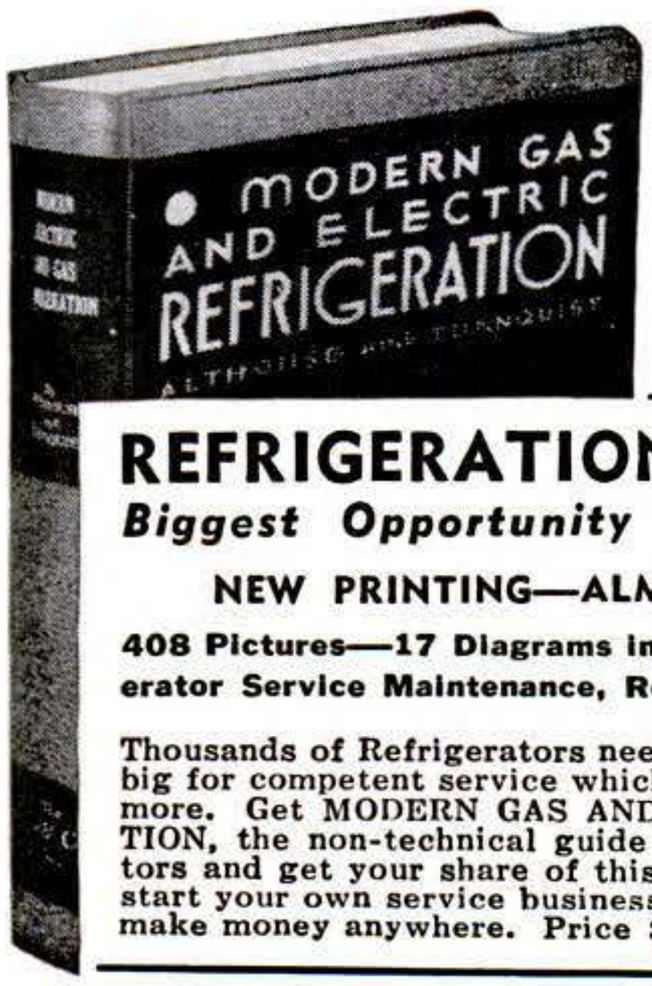
New Material on Transmissions, Trucks, Tractors, Diesels, Aircraft and Auto Engines

Now with millions of cars needing repairs and thousands of men needed to do the work, you need the famous DYKE Auto Book more than ever before. This big 20th Edition covers all principles, construction, repair, adjustments, testing, troubles and remedies of all cars. Over a half million copies of 20 editions of Dyke's have been sold. Gives specifications of old and newer cars. World's biggest book value. **$7.00.**
This big book, a complete auto library in one volume, has 1483 pages—4600 illustrations and diagrams—weighs 6 lbs.—equal to 4 ordinary books.

BAILEY'S HANDBOOK
For Engineers and Firemen

World famous handbook of universal questions and answers for Stationary, Marine and DIESEL engineers and firemen. Prepares for any license examination. This is the one book that men should have if they want to reach the top in installation, maintenance and operation of Diesel and steam plants. Pocket size, $2.00.

Goodheart-Willcox Co., Inc.
2009 S. Michigan Ave., Dept. 32, Chicago 16, Ill.



15 Million Refrigerators Need Service and Repairs

REFRIGERATION—*Book of the Hour!*
Biggest Opportunity in Many Years!

NEW PRINTING—ALMOST 1000 PAGES

408 Pictures—17 Diagrams in Colors Makes All Refrigerator Service Maintenance, Repairs Simple as A. B. C.

Thousands of Refrigerators need repairs! Owners will pay big for competent service which will be needed more and more. Get MODERN GAS AND ELECTRIC REFRIGERATION, the non-technical guide to all types of refrigerators and get your share of this new profit. Get a job or start your own service business. This book will help you make money anywhere. Price $5.00.

SEND NO MONEY! Mail Coupon

GOODHEART-WILLCOX CO.,
2009 S. Michigan Ave., Dept. 32, Chicago 16, Ill.

Send books checked, C.O.D. I will pay postman, plus few cents charges. If not satisfactory I will return books in 5 days and you will refund money paid. (Outside U.S. or possessions remit with order.)

- ☐ Gas & Electric Refrigeration $5.00
- ☐ Dyke's Auto Book $7.00
- ☐ Dyke's Carburetor Book . $3.50
- ☐ Modern Welding $4.00
- ☐ Airplane Welding $3.50
- ☐ Sheet Metal Layout $3.50
- ☐ Air Conditioning $4.00
- ☐ Engineers Handbook ... $2.00
- ☐ Body and Fender Repair . $3.50
- ☐ Shop Math. (2 vols.) ... $3.00
- ☐ House Wiring $3.00
- ☐ A.C. Power Wiring $4.00
- ☐ D.C. Power Wiring $4.00

If remittance accompanies order we will pay all postage charges under same return privilege.

Name _____

Address _____

City _____ State _____

Copyrighted material

AVIATION *Career*

MAXIMUM TRAINING IN MINIMUM TIME

CAL-AERO TECH TRAINING will add dollars to your pay check all the rest of your life. Specializing in AERONAUTICAL ENGINEERING and MASTER AVIATION MECHANICS since 1929, Cal-Aero Tech training is carefully designed for just one thing—TO MAKE MORE MONEY FOR YOU. An alumni of over 6000 successful graduates proves our career training is unsurpassed.

APPROVED FOR VETERANS

CAL-AERO TECHNICAL INSTITUTE

MAJOR C. C. MOSELEY — PRES. SINCE 1929

FORMERLY CURTISS-WRIGHT TECHNICAL INSTITUTE

GRAND CENTRAL AIR TERMINAL
GLENDALE 1, CALIFORNIA
LOS ANGELES COUNTY

MAIL THIS COUPON TODAY!

Cal-Aero Technical Institute, Grand Central Airport, Glendale 1, California
Please send full information on Aviation Training FREE—without obligation. Dept PS-2

Name_____ Birth Date_____

Street_____

City_____ State_____

Do you want

..to go to College?

..or to enter a Profession?

(Such as Accounting, Architecture, Nursing, Dentistry, Teaching, Social Work, Osteopathy, Beauty Culture, Optometry, Embalming, Chiropody, Law, Medicine, etc.)

..or get an Office Position?

To get anywhere, you practically MUST finish High School FIRST. You can complete our simplified High School Course in SPARE time at home, as FAST as your time and abilities permit. Equivalent to resident school work—prepares you for college, pre-professional examinations, business, industry. Standard texts furnished. Diploma. Credit for H.S. subjects already completed. Single subjects if desired. Low tuition, easy terms. American School, Chicago, est. 1897—endorsed by educators. Finish your high school education NOW. Write TODAY!

High School Course at Home

Many Finish in 2 Years

American School, Dept. H246, Drexel Ave. at 58th St., Chicago 37

Gentlemen: Send me FREE information covering special training in subjects checked below. No obligation on my part.

- ☐ High School Course
- ☐ Electronics, Industrial
- ☐ Architecture and Building
- ☐ Automotive Engineering
- ☐ Business Management
- ☐ Electrical Engineering
- ☐ Elec. and Gas Refrigeration
- ☐ Air Conditioning
- ☐ Railway Training
- ☐ Diesel Engineering
- ☐ Drafting and Design for Men and Women
- ☐ Plastics
- ☐ Private Secretary
- ☐ Mechanical Engineering
- ☐ Aviation
- ☐ Salesmanship
- ☐ Radio

Name.....

Address.....

NEW EASY WAY TO MAKE MONEY at HOME

YOUR COST ONLY 5c
YOU GET $5.00,
FULL OR SPARE TIME.

It's easy to Bronze Baby Shoes. Business still in infancy. Get in on ground floor and skim cream of profit from rich and never-ending market. No experience needed. **Learn in one week.** Income up to $1,000 a month full time—$50 to **$75 weekly in spare time.** We furnish complete kit and full instructions. So easy to understand that a 12 year old can become **expert.**

FREE FACTS. Write today. Don't send a penny. Just name and address in letter or postcard. Be the first in your territory to reap rewards waiting. Costs only 5c to bronze shoes. Sell for $5.00! This is too good to miss. Get facts today. Write to

KIKTAVI COMPANY, Dept. 17
8620 So. Ruthelen — Los Angeles 44, California

THERE'S MONEY IN CARTOONS!

RAYE BURNS will teach you HOW to CREATE ORIGINAL CARTOONS at home that you may SELL! Course contains 26 lessons and over 600 illustrations. All for *Only* . . $2.85

Send name and address for free details.

RAYE BURNS SCHOOL, Dept. S, Box 3583, CLEVELAND, OHIO

25 lbs. SURPLUS RADIO PARTS $5.00

A gold mine of parts for repairmen, amateurs, and experimenters . . . sockets, condensers, resistors, transformers, coils, hardware, wire, etc., etc. An outstanding bargain in **usable** parts! Send $2.00 cash, check or M.O. today!
(Pay small express charges on receipt.)

ELECTRONIC DISTRIBUTORS, Inc. Dept. S2 620 W. Randolph St., Chicago 6, Ill.

NEW! MINIATURE DUST MASK

Wear when sanding, grinding, paint spraying, sweeping, dusting, furnace cleaning, etc. Handy as a pair of glasses. Just keep mouth closed and breathe through nose is all you do to operate. Protects against nuisance dusts, lint, coal, cement, grain dust, Hay Fever Pollen. Has 9 sq. in. filter.

For EYE protection against paint spray, dusts, gases, fumes, smoke, order our Fog-Proof Rubber GOGGLES.....*$2.00 p.p.*

Order Today $1.00 POST PAID

JERRY BRYANT, Dept. PS, 919 N. Michigan Ave., Chicago 11, Ill.

ELECTRIC WELDER

AC or DC 110 Volts

Pre-war type—All metal—No chemical—5 year written guarantee. Welds 1/8" thick metal or money back. Repairs tanks, tools, fenders, machine parts, etc. Comes complete with rods, unit directions and eye shield. We also manufacture a set you can learn with for only $3.95 complete. On C.O.D. mailing charges extra.

$6.45 Complete

ESSAY MFG. CO., INC., Dept. P.S., Quincy 69, Mass.

BROKEN JEWELRY WANTED

All kinds. Highest prices paid for jewelry, rings, spectacles, gold teeth, diamonds, broken and usable watches, etc. Cash mailed promptly. Write for FREE shipping container.

LOWE'S, Dept. PS, Holland Bldg., St. Louis 1, Missouri

BUY DIRECT! SAVE ON BASEBALL Uniforms

LETTERING AT NO EXTRA COST — $7.50

Team Mgrs. These professional cut, large, roomy uniforms are quality tailored of sturdy Cricket Cloth. Unequalled values at the price. 10 letters sewn on free. Equal savings on all baseball equipment.

Write for **illustrated catalog and fabric samples**

1948 RULE BOOK enclosed free

BACHARACH RASIN CO., Dept. 26, 14 N. Howard St., Baltimore-1, Md.

Copyrighted material

Now YOU CAN HAVE IMPROVED No-DRIFT FM *in the Sensational New 1948* MIDWEST RADIOS

NEW SERIES 16* SUPER DELUXE AM-FM CHASSIS

14½" PANASONIC SPEAKER

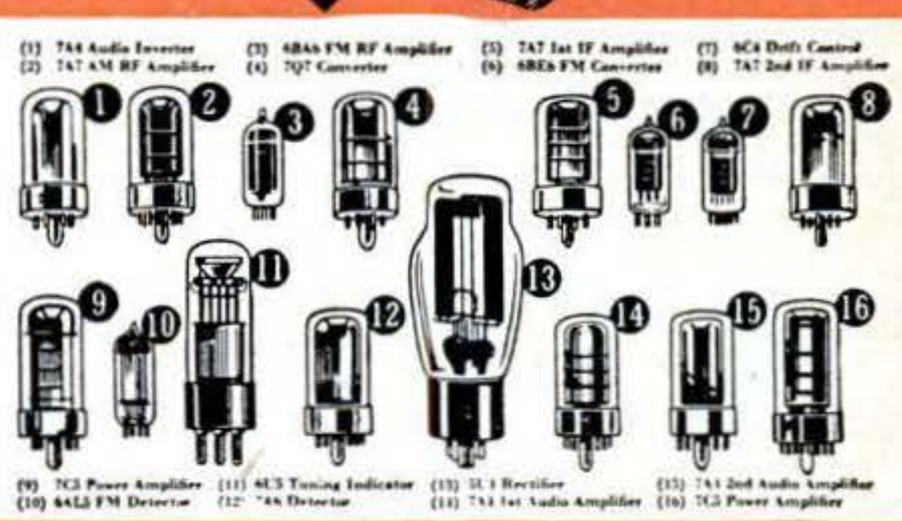
5 WAVE BANDS

Here is the finest radio Midwest has ever produced in its 28 years of manufacturing—a world-ranging, 5-band radio with improved Midwest No-Drift FM . . . plus Standard Broadcast and 3 short wave bands, Television Audio Switch-over, and Color-Ray Tone Selection. The Series 16* Super De Luxe Chassis is a powerful, magnificently-toned radio that challenges comparison for performance, sensitivity, selectivity, and advanced engineering features. Supplied with satin stripe copper finish panel—ready to mount in your present cabinet. Send today for the FREE 1948 Midwest Radio Catalog. Buy your radio direct from the manufacturer on Easy Terms and 30 Days Trial and SAVE!

*SERIES 16 CHASSIS USES ALL THESE LATEST-TYPE TUBES, RECTIFIER AND TUNING INDICATOR

30 DAYS TRIAL · **LOW FACTORY-TO-YOU PRICES** · **EASY TERMS**

A COMPLETE LINE OF FINE RADIOS AND RADIO-PHONOGRAPHS . . . *Available in Separate Chassis Like the Powerful Series 16* AM-FM Model above, or in beautiful Radio-Phonograph Consoles like this:*



Scores of NEW Features such as the Exclusive MIDWEST TRI-MAGNADYNE COIL SYSTEM and COLOR-RAY TONE SELECTION

SYMPHONY GRAND AM-FM RADIO-PHONOGRAPH CONSOLE *with NEW Intermix AUTOMATIC RECORD CHANGER*

Our Finest! A superbly beautiful musical instrument . . . a masterpiece of furniture design and radio engineering that offers the sensational Midwest NO-DRIFT FM, Automatic Intermix Record-Changer, Exclusive Color-Ray Tone Selection, World-ranging 5-Band Reception, Television Audio Switch-Over, and many more new and exclusive features.

Rush for Free Catalog!

FILL IN COUPON AND MAIL TODAY OR JUST SEND YOUR NAME AND ADDRESS ON 1c POSTCARD

MIDWEST RADIO CORP.
Dept. 24-T, 909 Broadway
Cincinnati 2, Ohio

Gentlemen: Please send me your new FREE catalog and details of your liberal 30 Days Trial.

Name.....

Address.....

City..... *Zone*..... *State*.....

MIDWEST RADIO CORP.
Dept. 24-T • 909 BROADWAY • CINCINNATI 2, OHIO

Copyrighted material

LINGUAPHONE

is your Passport to the World

In your own home, alone or in a group, you can now learn to speak

SPANISH • PORTUGUESE
FRENCH • RUSSIAN
ITALIAN • GERMAN

or any of 23 other languages by the world-famous

LINGUAPHONE Conversational METHOD

You learn the new language by listening to voices of native teachers. It is amazingly simple; thousands have succeeded. Educators hail Linguaphone as a notable advance in simplifying the mastery of languages. That is why so many Linguaphone Sets are used in schools, colleges, universities, as an aid to *fluent* speaking.

Available to Veterans under G I BILL OF RIGHTS

SEND FOR FREE BOOK

LINGUAPHONE INSTITUTE
95 RCA BUILDING, NEW YORK 20, N. Y.

LINGUAPHONE INSTITUTE
95 RCA Bldg., New York 20, N. Y.
Send me the FREE Linguaphone Book.
I am ☐, am not ☐ a World War II Veteran
I want to learn.....language.
Name .....
Address..... City.....

$9.95 TAKES ALL THREE BIG BARGAINS

1. AUDIO AMPLIFIER. Undreamed of value. Uses 6V6's. Has 4 microphone inputs brought to jacks at rear panel. Various output impedances available at rear panel connections. Steel case with chrome handles. 9" long x 9" high x 6" deep. Tubes included. New in original carton. Shipping weight 15 lb. SUPER SPECIAL—$4.95 while supply lasts.

2. RADIO HEADSETS. Latest supersensitive type with rubber earpieces. Every pair guaranteed perfect. $.59 per pair OR 3 PAIRS FOR $1.00.

3. HOME WORKSHOP AT BARGAIN PRICE. Accurate and precise 2 speed guaranteed hobby lathe, the essential machine for the home workshop. Sturdy enough for light production work or factory standby service. Supplied with 56" of belting for connecting to any available electric motor or power take-off, such as on a jeep or tractor. Also included in this unbelievable offer are such accessories as a ½" drill chuck with specially hardened tool steel jaws, a 4" electric furnace high speed grinding wheel, a cotton buffing wheel with a large supply of buffing compound, and a 4" steel wire scratch brush. Your cost $6.00. Sole export agent. Distributor inquiries invited.

ORDER NOW—DON'T DELAY—NO C.O.D.s

BUFFALO RADIO SUPPLY 219 Genesee St. Buffalo 3, N. Y.

MASSAGE THOSE ACHES with the INFRA-RED HEAT APPLICATOR

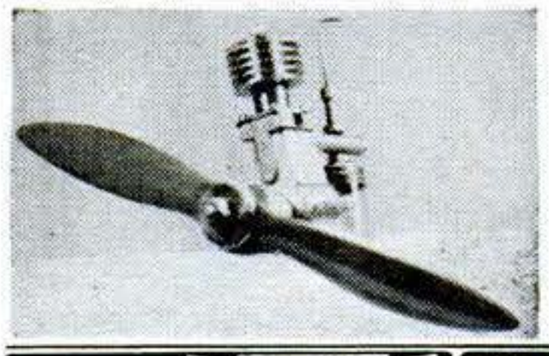
Join the thousands who bless the relieving comfort of this remarkable infra-red heat applicator. Use it for colds, stiff neck, muscular pains, toothaches, facial massage, sinus pains . . . even on feet chilled by poor circulation! Plug into wall socket—AC or DC—and apply curved plastic head to aching spot. Infra-red rays diffuse comforting, warming heat. Safe, easy to use. In unit small enough to carry in handbag when traveling. **$3.45**

AGENTS WANTED

SIBERT & CO. 43 Rankin St., Newark 3, N. J.

REAL DIESEL ENGINE

for Model Planes, Boats and Race Cars



Now you can own and run a real miniature diesel engine that operates by the heat of compression. No coil, condenser, wires, or annoying ignition failures. Simply flip the prop or flywheel to start. It's the new DEEZIL—a .125 cu. in. displacement, 5 oz. engine that runs at 8000 RPM. **Order today; only $12.95 p.p., less tank. Every engine fully tested and guaranteed. DEEZILMIX FUEL $1.00; PROP 50c.**

GOTHAM HOBBY
107 E. 126th. St. N. Y. 35, N. Y., Dept. "S".

HOME BARS 25 DESIGNS

HOME BARS for genial hosts. Fun to make and use. 25 designs . . . built-in, portable bars; cellarettes, only $2.00. Send currency or check today. Money-back guarantee.
HOMECRAFT PLANS. Dept. S-108, 7241 Madison, Kansas City 5, Mo.

Class Pins and Rings

Artistic pins, rings and emblems. Finest quality. Reasonable prices from 30c up. Write today. Dept. 0, Metal Arts Co., Rochester, N. Y.

★ FREE Catalog

LEARN TO PLAY AN

ACCORDION

"THE PAGANI WAY"

WRITE FOR DESCRIPTIVE CIRCULAR

O. PAGANI & BRO., INC. 289 Bleecker Street New York 14, N. Y. Dept. S

EXCITING FILMS

Extraordinary and unusual 8-16mm. Silent and Sound Films to thrill your Home Movie Audiences.

For Sample Film and Special List send only 10c to...

EXCITING FILMS 1071 EL CENTRO HOLLYWOOD 38, CAL.

AMAZING SAVINGS

JUST OUT OF PAWN!

GENUINE HIGH QUALITY

DIAMONDS

UNREDEEMED DIAMOND PLEDGES DIRECT TO YOU! SAVE UP TO 50%!

Full cut genuine diamonds, expertly reset in beautiful modern mountings of 14 Kt. Yellow or White Gold, ladies' or men's, priced at a small fraction of retail value. Over 100,000 satisfied customers. Iron-clad guarantee. Wear your diamond 7 days. Your money refunded immediately if not delighted. Order from this ad.

Also write us for FREE illustrated catalog of other Unredeemed Diamond Pledges from $5.00 to $5000. Small deposit holds any diamond until wanted. Write us today. Bank Reference on request, or your own bank.

1/5 Ct. ($125 Value) **$49.00** Tax included.

BERMAN'S COLLATERAL LOAN BANK
Dept. P-6, 636-38 W. Balto. St. Baltimore-1, Md.

Copyrighted material

Learn BUILDING

AT HOME • All Blue Print Building Plans, Specifications, Lessons Furnished

Earn more money as a building tradesman. Prepare for advancement and increased pay as a building foreman, superintendent, inspector, estimator, material buyer or salesman. Train to be a building contractor, have your own money-making business in this busy, prosperous building field.

More than 19 million new homes needed in U.S., say experts. New building now at rate of one million homes a year, plus 200,000 commercial buildings, plus expanding farm building construction.

Mail coupon today. FREE book tells how you learn Building Construction—How to Read Blue Prints, and Estimate Building Costs—at home in your spare time. Learn modern construction methods and materials, how to lay out work and direct all building operations. This is the training needed for rapid advancement to higher-paid jobs, or your own successful building business.

FIND OUT ABOUT TRAINING AND OPPORTUNITIES FOR YOU IN BUILDING

Established in 1904, Chicago Technical College offers you thorough, practical training in Building, by home-study. Mail coupon for free information. See what this Course has done for others, what it can do for you. Read what Chicago Tech graduates say about their work, earnings, success. Learn the rewards awaiting you as a trained builder—and how quickly, easily you can get started. Simply MAIL COUPON TODAY in an envelope or paste on a penny postcard.

MAIL COUPON NOW

CHICAGO TECHNICAL COLLEGE
B-158 Tech Bldg., 2000 So. Michigan Ave.,
Chicago 16, Illinois

Mail me FREE building Lesson and information about big opportunities in BUILDING and how I can train at home.

Name.....Age.....

Address.....

City.....Zone.....State.....

CHICAGO TECHNICAL COLLEGE
B158, Tech Building, 2000 South Michigan Ave.
Chicago 16, Illinois

WHICH OF THESE *Opportunities* INTERESTS *You* MOST?

● *Today,* choose the job you want—and prepare for it. Or if you are already engaged in the work you like best, start training *now* for quicker promotion. Acquire the knowledge that will help you to get ahead faster, make more money and have greater security.

American School, founded in 1897 as an educational institution *not for profit,* can help you to reach your goal just as it has helped others during the past fifty-one years. Check the coupon at right, add your name and address and mail it at once. The school will send you details on its training plan and outline of study prepared by specialists. There is no charge, no obligation, so send the coupon immediately.

AMERICAN SCHOOL

Dept. G-246, Drexel at 58th Street, Chicago 37

CHECK, CLIP AND MAIL COUPON NOW

AMERICAN SCHOOL, Dept. G-246, Drexel at 58th, Chicago 37, Ill.
Without obligation, Please send FREE and postpaid, bulletin and details of the Subjects checked:

- ☐ PLASTICS ENG'R
- ☐ Refrigeration
- ☐ Architecture and Building
- ☐ Contracting
- ☐ Practical Plumbing
- ☐ Automotive Engr.
- ☐ Aviation Drafting
- ☐ Aviation
- ☐ Business Management
- ☐ Accounting
- ☐ Electrical Engr.
- ☐ Electricity-Pract.
- ☐ Electronics, Industrial
- ☐ Bookkeeping
- ☐ Private Secretary
- ☐ Diesel Engineering
- ☐ Sheet Metal Pattern Drafting
- ☐ Railway Training
- ☐ Drafting and Design for Men and Women
- ☐ Radio
- ☐ High School
- ☐ Air Conditioning
- ☐ Mechanical Eng.
- ☐ Shop Management
- ☐ Tool Making
- ☐ Better Foremanship
- ☐ Machine Shop Operations

Name.....*Occupation*.....
Address.....*Age*.....
City.....*State*.....

Copyrighted material

New BRUSH Electroplater

ESPECIALLY BUILT FOR MECHANICS, MODEL MAKERS HOME CRAFTSMEN

For
- MODEL MAKERS
- MAINTENANCE
- HOBBY SHOPS
- HOME SHOPS
- SALVAGE PARTS

Easy to Plate GOLD, SILVER, NICKEL, COPPER, etc... *For Pleasure and Profit!*

If you have a workshop—at home or in business—you need this new Warner Electroplater. At the stroke of an electrified brush, you can electroplate models and projects—you can replate worn articles, faucets, tools, fixtures, silverware, etc. with a durable, sparkling coat of metal... Gold, Silver, Nickel, Copper, Cadmium, *and after a bit of practice*, even Chromium! Everything furnished—equipment complete, ready for use. *By doing a bit of work for others, your machine can soon pay for itself.* So make your shop complete by getting a Warner Electroplater right away. Send today for FREE PLATING SAMPLE and illustrated literature. ACT AT ONCE.

WARNER ELECTRIC CO., Inc., Dept. R33
1512 Jarvis Ave., Chicago 26, Illinois

FREE *Details & Sample!*

WARNER ELECTRIC CO., Inc., 1512 Jarvis Ave., Chicago 26, Illinois, Dept. R33
Gentlemen: Send Free Sample and Details to:

*Name*_____

*Address*_____

*City*_____ *State*_____

Say You Saw It In Popular Science

Calling all Men... STRIP-TEASE NECKTIE THAT GLOWS IN THE DARK

"SHE LOSES HER CLOTHES AS SHE GLOWS IN THE DARK"

Astounding new STRIP-TEASE NECKTIE is the latest rage from coast to coast! Spectacular new novelty tie creation for men who demand the distinctive and unusual! Brings gasps of sheer wonder, thrilling admiration the first time you wear it! **By day**, smart, handsome tie that is unrivalled for sheer beauty and extravagant good looks, **by night** a glorious goddess of light revealed for all to see! She loses her clothes as she glows in the dark! A glorious, gleaming blonde beauty revealed in daring pose in the briefest of costumes, mysterious and magnificent! Write today and if you don't agree this outstanding new necktie sensation is the most exciting tie you've ever seen—it costs you absolutely nothing.

SEND NO MONEY—

Special Introductory Offer

Send your name and address, receive startling new Strip-Tease Necktie by return mail. Pay postman just $1.64 (3 for $4.79) plus postage and keep 10 days. If in that time you aren't thrilled and delighted, return for money back without question! Write to

GLOW IN THE DARK TIE CO., DEPT. 453-S
215 N. MICHIGAN AVE., CHICAGO 1, ILL.

WAKE UP YOUR SCALP Want better looking hair? Embarrassed by falling dandruff, itching scalp? Then try VITABRUSH, new electric driven scalp brush that gives your scalp a vigorous and invigorating "workout" in just three minutes of fun. Cleans scalp. Stimulates blood supply. Restful. Pleasant. Write *today* for complete information and satisfaction-guaranteed offer.. Hershey Mfg., 3740 Field Bldg., Chicago 3

TRAIN Your VOICE!

Results GUARANTEED

We build, strengthen the vocal organs—not with singing lessons—but by sound, scientifically correct silent and vocal exercises and absolutely guarantee complete satisfaction with results. Write for Voice Book, FREE. Sent to no one under 17 years old unless signed by parent

Perfect Voice Studios, Studio 1362, Kimball Hall Bldg., Chicago 4, Ill.

SUIT YOURS *AS A BONUS*

And Big Money in Spare Time, Too

We want you to wear this fine made-to-measure suit! Make it yours by sending a few orders, and earn BIG CASH PROFITS in spare time. Your suit will help you get more orders with scores of rich, quality fabrics, tailored-to-measure to newest styles. Also Ladies' Tailored Suits—complete line. Write today for FREE SAMPLES. No experience, no money needed. For quick action tell us about yourself.

J. C. FIELD & SON, Inc.
Harrison and Throop Sts., Dept. B-1721, Chicago 7, Ill.

CHICKS on 30 Day's Trial

SEXED

guarantee. Money refunded on any chicks not true to breed. No need to take chances. You get 30 days to make sure chicks are as represented. Male or pullet chicks furnished. Low prices. All varieties. Mo. Approved. Easy buying plan. Big discounts on early orders. Chick Manuel FREE.
MISSOURI STATE HATCHERY. Box 290 BUTLER, MO.

HOW TO OVERCOME FEAR, WORRY

If you are worried by personal problems, take courage! You can develop a powerful personality, regain self-mastery, mental and physical health. Dr. Radwan's mechanized suggestion (records) enables you to control your subconscious mind, regain mental harmony and joy of living. No will power, no study needed. Write for free personal check-up and booklet "Your Health, Success, Happiness."

RADWAN INC.
366 Madison Ave. Dept. S. New York 17, N. Y.

WHEN KIDNEYS Work Too Often

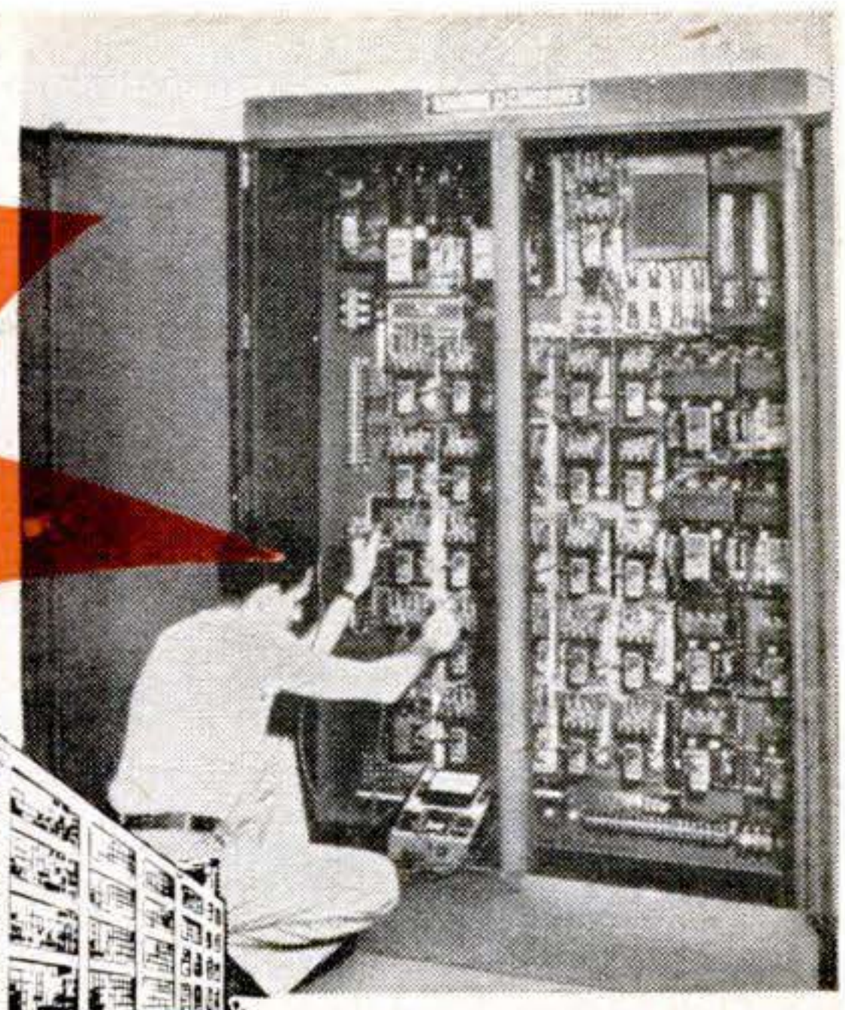
Are you embarrassed and inconvenienced by too frequent elimination during the day or night? This symptom as well as Smarting Passages, Backache, Leg Pains, Nervousness, Rheumatic Pains and Swollen Ankles may be due to non-organic and non-systemic Kidney and Bladder troubles. In such cases the very first dose of the scientifically compounded medicine called **Cystex** usually goes to work right now helping you these 3 ways: 1. Helps nature remove irritating excess acids, poisonous wastes and certain germs. 2. This cleansing action helps nature alleviate many pains, aches, soreness and stiffness. 3. Helps reduce frequent night and day calls, thus promoting better sleep.

Get **Cystex** from your druggist today. Give it a fair trial as directed on package. Money back guaranteed unless **Cystex** satisfies you.

Copyrighted material

TO BE THE BEST—GET THE BEST!

Get MODERN TRAINING in ELECTRICITY on MODERN EQUIPMENT



Student trouble-shooting large control panel in school shops.

In NATION'S LARGEST EXCLUSIVE ELECTRICAL SCHOOL

BIG PAY JOBS in ELECTRICITY ONLY WEEKS AWAY!

M. T. I.—where all-around electricians are made. This is NOT A HOME STUDY COURSE—but practical resident shop experience . . . "Learn-by-seeing" MOVIES plus "Learn-by-doing" methods on actual equipment. Learn HOUSE WIRING, A.C., D.C. MOTORS, ARMATURE WINDING, POWER PLANT WORK, ETC. New classes start every few weeks. Part time work available. Living arrangements made. Train NOW in modern shops of M. T. I.

VETERANS. *Train at Government expense on G.I. Bill. Get subsistence pay while training.*

MICHIGAN TECHNICAL INSTITUTE
Department PS-2, 2281 West Fort Street, Detroit 16, Michigan

MAIL TODAY FOR QUICK ACTION

MICHIGAN TECHNICAL INSTITUTE, Dept. PS-2
2281 W. Fort St., Detroit 16, Michigan

MAKE MORE $$$$

☐ Send me catalog and complete information.
☐ I am a GI. Send special information.
☐ Married. ☐ Single.

NAME _____
ADDRESS _____
CITY _____ ZONE ____ STATE ____

DETECTIVES

Home Study in Detective Training—Professionally Modernized—Recognized Instructors—Easy Payments—Write
INTERNATIONAL DETECTIVE TRAINING SCHOOL
1701-P Monroe St. N. E. Washington 18, D. C.

SIGN MEN EARN WELL

Tremendous demand always for glass and electrical sign men. Post war expansion assures growing need for more sign men. Only small investment required to start own business. Write today for full **FREE** particulars. **SIGN SERVICE, 5944 Newark, Dept. S-202, Chicago 31, Ill.**

LEARN MEAT CUTTING EASILY-QUICKLY At Home-In Spare Time

The steady, dependable trade of Meat Cutting taught easily, quickly by improved HOME METHOD. National School, established over 25 years, has organized its famous "Learn By Doing" Classroom, Cutting room and Retail Market training system into sound, practical HOME STUDY form.

Now, by the miracle of this EXTENSION TRAINING you can prepare in Your Spare Time At Home, for a better job, bigger responsibilities or success and security in a store of your own. Remember, PEOPLE MUST EAT!

Buying, cutting, percentage, pricing, advertising, selling—a complete meat education. For beginner or men with experience. Thousands of successful graduates. Send coupon for FREE Bulletin NOW!

MAIL THIS COUPON TODAY FOR FREE BULLETIN

National School of Meat Cutting Div. 063, Toledo 4, Ohio

Send me your FREE Bulletin on Meat Cutting and Meat Merchandising. No obligation. No Salesman will call.

Name.....

Street.....

City.....State.....

Copyrighted material

MEN! BOYS!
Discover the
MUSCULAR GIANT
In Your Body!
says *Joe Bonomo*

LET ME DEVELOP YOUR

"Power-Potential"

Build up the mighty strength deep inside you . . . enjoy the full power of a muscle-packed, strength-charged MANLY BODY! Be admired by women — respected by men! Send at once for my amazing, tested

21-DAY SPEED COURSE
for quick work on Arms, Legs, Back, Chest!

I've helped weaklings develop amazing physiques . . . average men develop rippling, sinewy muscle . . . discover new strength, power, energy . . . through their "Power-Potential." Why not YOU? Here's a $5.00 value, but you pay only $1.00 — full price for *everything!* Get started *now!* MONEY BACK GUARANTEE!

FREE **Membership in the Strong Men's Club of America!**

Send only $1.00 today for the famous $5.00 value 21-Day Speed Course. As Director of Strong Men's Club of America, I'll send your personal membership card FREE. No dues! No obligations! Many valuable privileges! Don't just wish for strength—develop YOURS into a RUGGED, MANLY PHYSIQUE! Mail $1.00 (cash or money-order) to:

JOE BONOMO Director — **Strong Men's Club of America** Dept. S-2, 1841 Broadway, New York 23, N. Y.

ELECTRICIANS

Get this Great Book **FREE**

Book of 150 Shop Prints, Wiring Diagrams, Full Size 8½ x 11"

For Merely Examining Coyne's NEW Pay Raising

8 Volume Set APPLIED ELECTRICITY

Here's a *brand new* set of electrical books to give you the "know how" on all branches of electricity from appliance repairing to D.C. and A.C. equipment, electrical refrigeration, Industrial Electronics, etc. 3,400 subjects, 11,500 facts, latest methods explained in easy to follow instructions. To prove how valuable and Practical this set can be to you, I'll *give you a FREE copy* of my book "150 Shop Prints and How to Read Them" *just for looking over this set.* Written by the Coyne Staff and backed by 47 years' experience, this set has helped many ambitious electrical workers to *bigger pay and added opportunity.*

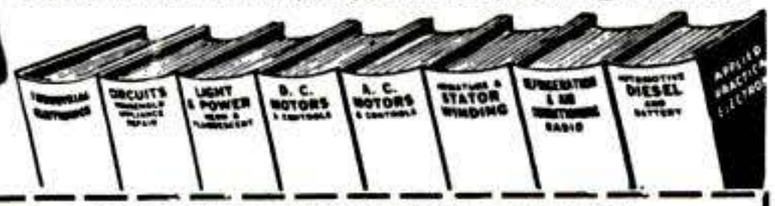
OFFER LIMITED • ACT NOW! If you act promptly, I'll send you the 8 volume set Applied Practical Electricity for 7 days FREE examination . . . together with the 150 Shop Print Book. Look the set over 7 days. If you like it send either $22.75 cash or $3.00 after 7 days and $3.00 per month until $24 is paid. If you don't want the set, return it and YOU OWE NOTHING. *In either event you keep the 150 Shop Print Book absolutely FREE.*

Coupon below is just a request to see the books free and to get my gift book for doing it. ACT—Send coupon Today!

Technical Book Div. COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept. 28-R8, Chicago 12, Ill.

FREE BOOK Coupon

SEND NO MONEY



B. W. Cooke, Director COYNE ELECTRICAL SCHOOL
500 S. Paulina St., Dept. 28-R8, Chicago 12, Ill.

O. K. send me, postpaid, Coyne's new 8 volume, "Applied Practical Electricity" for 7 Days FREE TRIAL per your offer. Also send, absolutely FREE, the book of 150 Shop Prints as a gift.

Name . . . . . Age . . . . . .

Address . . . . . .

Town . . . . . Zone . . . . State . . . . . .

Famous **BAILEY DIESEL SCHOOLS**
Now Accepting
CIVILIAN STUDENTS!

Bailey has a national reputation for "finest training methods." Bailey teaches you fundamentals, plus the practical application of theory in plenty of actual shop work. Bailey is *approved* by industry. Bailey graduates get the jobs!

Civilian men and boys over 17 who are ambitious to get ahead will act now. Send for FREE catalog. No salesman will call.

BAILEY TECHNICAL SCHOOLS
1656 So. Grand Blvd., St. Louis, Mo.

Learn MECHANICAL DENTISTRY

A profession offering unlimited opportunities. Most modern and complete course embracing every branch from Plate to Porcelain Work, which prepares you to work for Dentists or start your own business. Individual instruction —practical training in day or night school. No books—no classes. Catalog upon request.

McCARRIE SCHOOL of Mechanical Dentistry, 207 N. Broad St., Dept. 871, Philadelphia, Pa

BE A REAL ESTATE BROKER FREE BOOK TELLS HOW

Start and run your own business *Quickly.* All phases of business taught in Home Study or Classroom—Both G. I. Approved. WRITE TODAY for Big Illustrated Book. **WEAVER SCHOOL OF REAL ESTATE, 15 East Pershing Road, Dept. PC, Kansas City 8, Mo.**

CORRESPONDENCE COURSES IN
RADIO and ELECTRICAL ENGINEERING
Tuition $25

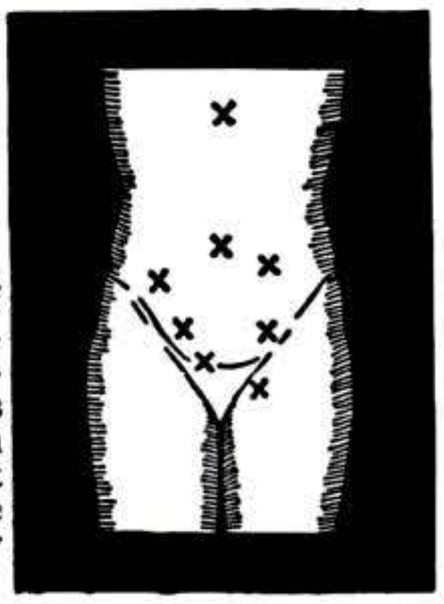
ELECTRICAL ENGINEERING. Get good grasp of wide electrical field. Modern. Very understandable. Theory made easy.
RADIO ENGINEERING. Extra fine course in radio, public address, photo-electric work. Trains you to be super-service man, real vacuum tube technician. Tuition ONLY $25. either course. Deferred payment plan. Servicemen needed badly.

FREE Write for free copies of school catalogs, student magazines, etc.
LINCOLN ENGINEERING SCHOOL, Box 931-S-110
LINCOLN, NEBR.

EYE-GLASSES BY MAIL
16 Days Trial

Write Today for Free Catalog. Send no Money
ADVANCE SPECTACLE COMPANY
537 South Dearborn Street, Dept. SP-1, Chicago, Illinois

Is Your Rupture HERE?



Why continue to suffer with an uncomfortable truss if we can help you? Relief GUARANTEED or it costs you nothing. Send for the facts about my perfected truss invention — the Brooks Appliance for reducible rupture—with the patented AIR-CUSHION support that works silently with **Nature** to give protection. Thousands bought by doctors.

Sent on Trial—Made-to-measure, individual fitting for man, woman or child. Low-priced, sanitary, durable. No obnoxious springs or hard pads; no metal girdle to rust. Light weight, neat and comfortable. Not sold through stores or agents—beware of imitations. Write today for full information sent free in plain sealed envelope.

BROOKS APPLIANCE CO. 163 State St. Marshall, Mich.

Copyrighted material

Young Man! Now You're Out of School . . .
YOU WANT TO GET AHEAD—MAKE MONEY

Choose from these 5 Trades

They Offer High Pay — Lifetime Work — Security

AUTOMOTIVE & TRACTOR Covers all phases of mechanical training, tune-up service, trouble shooting, repair, latest types model motors used for projects. **34 WEEKS.**

DRAFTING Elements and technique, drafting geometry, construction plans and specifications, auxiliary elevations, every phase. **32 WEEKS.**

PLUMBING Every step, from pipe cutting and threading, lead work, home and industrial installations, worked out in our own plumbing shop. **34 WEEKS.**

ELECTRICITY Basic principles, magnetism, current electricity, residential and industrial wiring, appliance repair **34 WEEKS.**

SHOE REPAIR From simplest repairs on boots and shoes to the finest details of reconditioning and rebuilding, under expert craftsmen **39 WEEKS.**

"There's an Endless Demand for the Man Who Knows"

For YOUR lifetime career, learn one of these interesting and well-paid trades NOW. Be trained FOR the job, not ON it. All courses under especially trained instructors with practical experience 6 hour Classes 5 Days a Week Our Employment Department helps you

VETERANS — If you qualify for any of these finer trade courses, your tuition and subsistence is paid by your government! Limited Enrollments. Don't miss this Opportunity!

Mail Today!

National Trade School, Dept. C 2610 Grand Ave., Kansas City 6, Mo.

Without obligation to me please send full information on the courses checked

..... Automotive and Tractor Technician ..... Drafting
..... Plumbing ..... Electricity ..... Shoe Repairing

Name ..... Age .....

Address .....

City ..... State .....

Veteran? .....

START
as high as $3,021.00 YEAR

MEN—WOMEN—

Over 20,000 appointments being made each month. Veterans get special exam preference.

Get Ready at once in your own home for Examinations

Mail Coupon Today—SURE

VALUABLE COUPON

Franklin Institute
Dept. T-80, Rochester 4, N. Y.

Rush to me, entirely free of charge (1) a full description of U. S. Government Jobs; (2) Free copy of illustrated 32-page book, "How to Get a U. S. Government Job"; (3) list of U. S. Government Jobs; (4) Tell me how to qualify for one of these jobs.

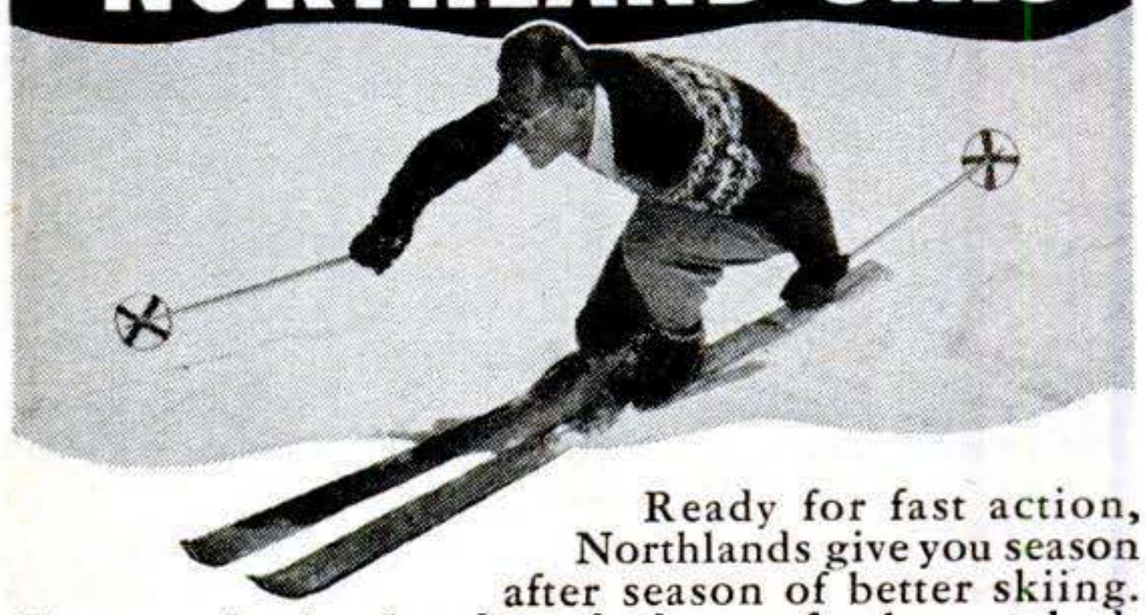
Name .....

Address ..... *Age* .....

Use This Coupon Before You Mislay It. Write or Print Plainly.

Copyrighted material

SPEEDIZED! NORTHLAND SKIS



Ready for fast action, Northlands give you season after season of better skiing. Because they're hand crafted—perfectly matched, Northlands make good skiing *easier* for beginners and experts alike. *Send 15 cents for Northland Ski Manual edited by Hannes Schneider . . . or write for free booklet.*

NORTHLAND SKI MFG. CO.

Supplier to the U. S. Olympic Ski Team

94 MERRIAM PARK ST. PAUL 4, MINNESOTA

UTILITY CABINET

36 Roomy Compartments
4-7" Drawers with Removable Partitions

A Thousand Uses For
HOBBYISTS
MECHANICS
DRAFTSMEN
TECHNICIANS

For home workshop factory, laboratory, garage, outdoors, fishing and hunting. Made of heavy gauge aluminum. Strong airplane construction. Sag proof—Rust proof.

$2.98 plus postage

2 lbs., 8 ozs. Shipping Weight

Cut out this coupon and send with money B

NAME.....

ADDRESS.....

CITY.....STATE.....

Enclosed find check or money order for $2.98

THE KNICKERBOCKER CO. ST. CLAIR, MICHIGAN

MUFFLERS
STEELS and ALUMINUMS with a motorboat tone

SINGLES, Chev., V-8, Plymouth, Steels $5.50, Aluminum $7.00. Chry., Olds., Buicks, etc., Steels $7.50, Aluminum $9.00. V-8 and MERCURY DUALS, Steel $17.50, Aluminum $21.00. Split Manifold Sets, Steels $35.00, Aluminum $45.00. Aluminums are guaranteed for life of your car.

SANDEE MUFFLER CO.
BOX 296 LA TIJ., LOS ANGELES 43, CALIF
2624 W. SLAUSON AVE., LOS ANGELES, CALIF.

SOLID BRASS 12 FT. PORTABLE

RADIO ANTENNAS

Real $15 Value Now Only $4.95 Postpaid

FOR HOMES, BOATS or AUTOS

Just Out! Gov't surplus used on Army tanks. These telescopic rustproof antenna have tremendous pickup eliminate dangerous wiring. Solid Brass throughout practically insuring NOISE FREE RECEPTION.

12 Exceptionally Rugged Sections compress into 1 ft. 4 in. Handy for Camping Trips, also Useful for Transmitting, FM & Television sets.

Each antenna comes with clamps, nut, lug, and wire. Easy to install anywhere.

QUANTITY LIMITED

ORDER TODAY. A real $15 value for only $4.95 Postpaid. Mail check or money order now or sent C.O.D. plus postage. Money back in 10 days if not satisfied.

RADIO HOSPITAL 442 East 86th St., Dept. B-14 NEW YORK 28, N. Y.

DUAL TAIL PIPE EXTENSION

Fits all cars—chrome plated

DEEP TONE

produced by 2½ inch outlets

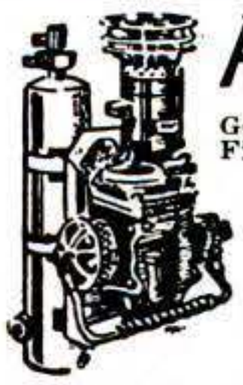
Postage free on prepaid orders

DEALER INQUIRIES INVITED

$2.95

LYONS PRODUCTS COMPANY
2319 Ridgeley Drive, Dept. PS2, Los Angeles 16, Calif.

AIR COMPRESSORS

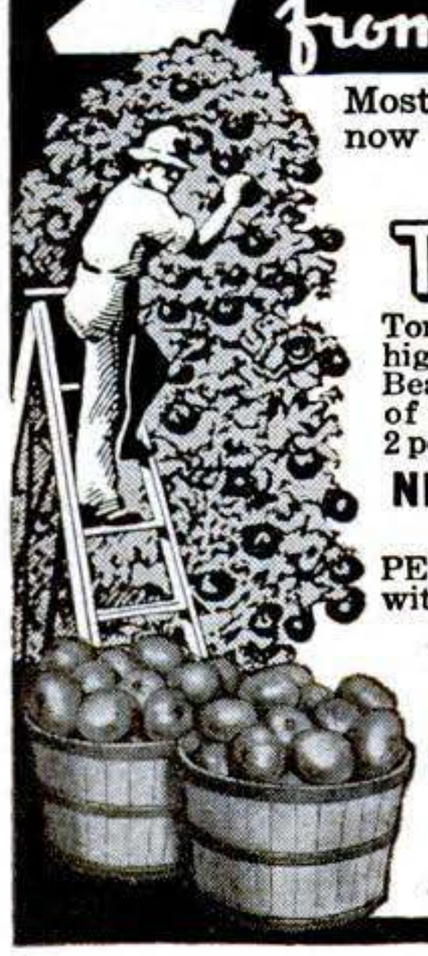


General Electric ⅓ Hp AC-DC complete with Tank and Fittings. 2 stage AC-DC. Rated pressure 1000 lbs. per sq. in., with ⅓ hp 27 volt, 7 ZMP series wound motor, equipped with fan for cooling. Thousands in use for spraying, inflating, laboratory use, etc. Can be adapted to 110 volt A. C. with transformers or 4 1000 heating elements. A real value at approx. 5% of orig. cost. Only..... **$14.95**

Transformer available for above at $14.95 FOB, K. C. Send check or M. O.

NATIONAL SURPLUS SALES 1810 CHARLOTTE ST. KANSAS CITY, MO.

2 Bushels of Ripe TOMATOES from ONE VINE



Most productive of all tomatoes now PELLETED at No Extra Cost.

BURGESS CLIMBING

TRIP-L-CROP

Tomato rapidly grows 12 to 18 feet high on trellis or as a bush in garden. Beautiful crimson solid, meaty fruits of finest quality, weighing over 2 pounds.

NEW POST-WAR PROCESS for Better Gardening

PELLETED Seeds have been covered with a coating of protective materials to encourage better germination, healthier plants and faster growth.

Trial Packet of Pelleted Trip-L-Crop Tomato Seed 10c

3 for 25c postpaid

1948 Garden Book FREE.

BURGESS SEED & PLANT CO.
207 P. S., Galesburg, Mich.

GORGEOUS GIRL ACTION PHOTOS

Shot by Special Speed Camera... one ten-thousandth of a second! Models of breath-snatching beauty captured in action. Unequalled, inspirational studies for artist & photographer.

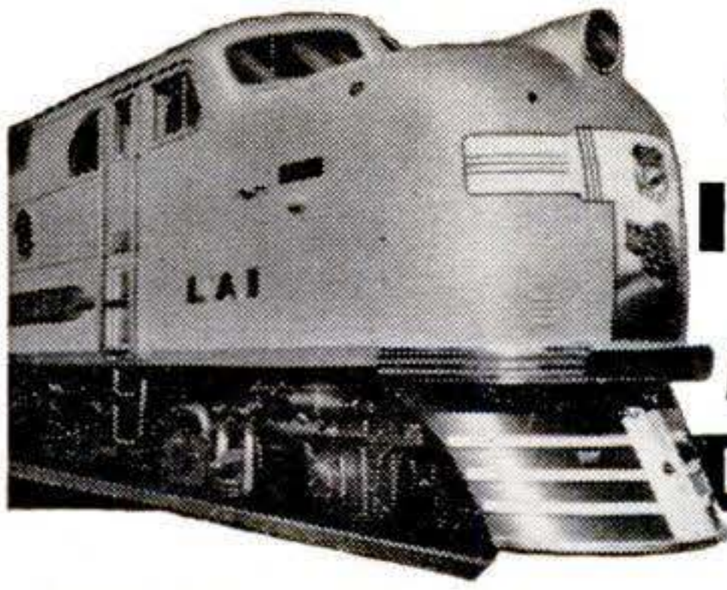
PER SET (of six photos) *only* $1.00

Send $5.00 for 5 Complete Sets, and get extra large Special Surprise Photo FREE.

FOR BEST SELECTION...ORDER NOW!

NOVEL-ART DIST. Box 1107, Hollywood, Cal.

Copyrighted material



GET INTO DIESEL NOW!

Let this Great School qualify You!

LEARN AT HOME IN YOUR SPARE TIME

• With National Schools' tested and proved Master Shop Method of Home Training, you can become a qualified Diesel and Automotive technician equipped to step right into a good paying job. One of America's great trade schools, established in 1905, stands behind your training!

National Schools-trained Diesel and Automotive Technicians Are Welcome Everywhere

Our files are filled with facts of National Schools-trained men who have reached success in their chosen field because of the thorough, practical and up-to-date instruction we gave them.

Diesel is becoming more and more important in transportation, industry and agriculture all over the world. trained men who have reached success in their chosen Fuel-Injection, Motor Tune-up, etc., are in constant demand to fill interesting, good pay jobs. Opportunity is here **now** for you.

Every Word and Picture in Your Home Study Course Comes out of the Great National Schools Training Shops

Behind all National Schools training is our permanent faculty of experienced instructors and engineers who will teach you about Diesel-electric, Internal Combustion Engines, including Diesel, Gasoline and Butane Types, High-octane fuels, Automotive Drive Systems, etc. National Schools instructors are daily teaching resident students in our modern, fully equipped Shops and Classrooms, using the same instruction methods and lessons you study at home in your spare time. These instructors **know how** to guide your home study!

TODAY'S GREAT OPPORTUNITIES IN DIESEL, AUTOMOTIVE AND ALLIED MECHANICS

Get These FREE BOOKS

It will cost you nothing to learn how you can grasp opportunity in the great Diesel industry. Send the coupon below for a sample lesson from National School's Home Study Course, and your big Opportunity Book giving further information.

G. I. APPROVED
NATIONAL SCHOOLS
LOS ANGELES 37, CALIFORNIA EST. 1905

MAIL OPPORTUNITY COUPON FOR QUICK ACTION

National Schools, Dept. PSD-2 (Mail in envelope or paste on penny postcard)
4000 South Figueroa Street
Los Angeles 37, California

Mail me FREE the book, **YOUR FUTURE IN DIESEL**, together with the Sample Lesson. I understand I may keep and use the information with no obligation.

Name.....Age.....

Address.....

City.....Zone....State.....

....Check here if Veteran of World War II

The Amazing new INTER-TALKIE

FOR OFFICES, STORES, HOMES, FARMS
LOWEST COST—EASIEST TO INSTALL!

Beautiful Black Silver or Walnut Silver plastic cabinets! Wt only 2 lbs! SETS ON ANY DESK-TABLE or HANGS ON ANY WALL! SELF POWERED! NO HUM-HOWLING-TUBES OR ELECTRIC "PLUG-INS" NEEDED! No shocks CLEAR ROOM VOLUME—NO EARPHONES! A REAL LOUDSPEAKING SYSTEM! ANYONE CAN HOOK THEM UP IN A MINUTE! Always Ready! Operates for 50c or less per year (average)

GUARANTEED FOR 3 YEARS

Just the thing for talking instantly between rooms, barn, garage, shop, to house, office, front door to kitchen, etc.—2 to 2,000 ft. apart! SAVES STEPS, TIME AND MONEY. Set of 2 with 50 ft. tiny wire and all instructions ONLY $19.95 complete (extra wire $1.00 per 50 ft). ORDER DIRECT. Send $5.00 deposit, Balance C.O.D. express on arrival (U.S.A. only). MONEY BACK GUARANTEE. Also 3-6 station systems, $12.95 per station.

PAKETTE RADIO CO., INC.
Dept. PS-2 KEARNEY, NEBRASKA

MAKE JEWELRY AND NOVELTIES AT HOME!

Work right on your kitchen table! No tools or experience necessary. Learn—earn within a week. Complete home instruction course, beautifully photographed, shows how to make 115 different designs of earrings, pins, sprays, brooches, hair ornaments, bracelets, candy dishes, ash trays, wall plaques, etc. Illustrates also 55 kinds of Sea Shells and Fish Scales often used. Explains fully home methods of dyeing, pearlizing, golding and glow-in-the-dark processes. Lists hundreds of raw materials with wholesale prices. Complete course only $1. Beginner's Kit, $3 ($3.50 in Canada), postpaid. Immediate shipments.

HOUSE of GIFTS, Box 4550-SP2, Coral Gables, Fla.

ELECTRICAL TRAINING

For Men of Ambition and Limited Time—Train for Successful Careers in Electricity

BLISS

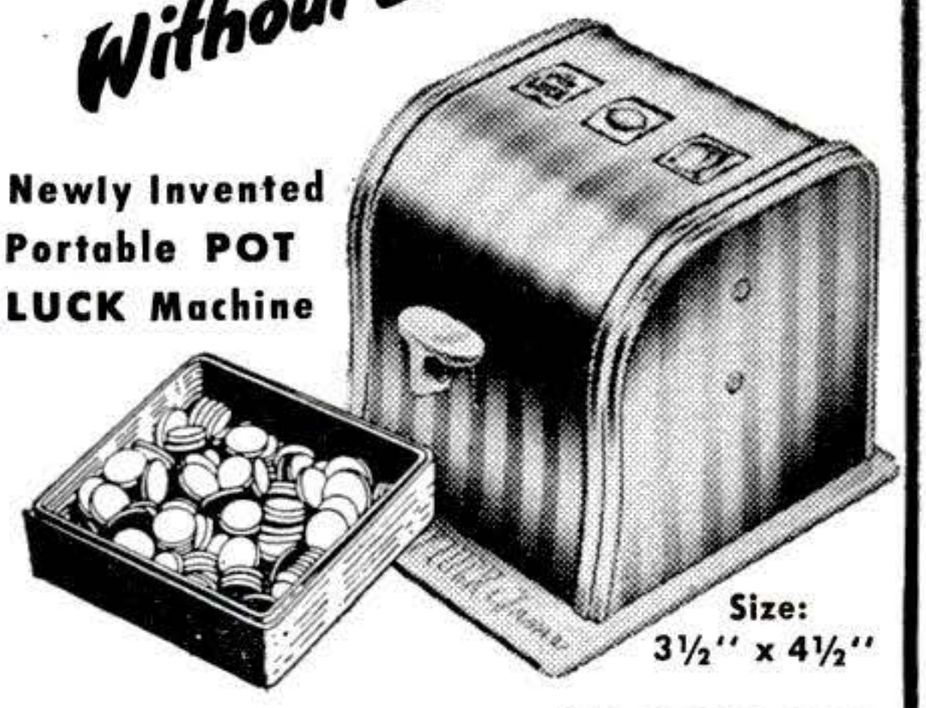
Intensive 32 weeks residence course in fundamentals of *industrial electrical engineering*, including radio and electronics. Extensive laboratory practice in electrical measurements; testing power equipment; circuit tracing; wiring techniques; radio and industrial electronics; use of machine tools; motor construction; drafting. A basic training meeting industry's requirements for engineering aides, laboratory assistants; operating, production and maintenance technicians; customer engineers; draftsmen. Graduates hold responsible technical and executive positions.

Modern buildings, dormitories, dining hall, campus. Moderate cost. 54th year. Classes begin March 22; July 26. For catalog write 7604 Takoma Ave., Washington 12, D. C.

ELECTRICAL SCHOOL
A TECHNICAL INSTITUTE

Copyrighted material

Get Thrills of Gambling Without Losing Money!



Newly Invented Portable POT LUCK Machine

Size: 3½" x 4½"

FUN TO HIT THE JACKPOT

Have all the thrills of winning with "Pot-Luck" . . the familiar symbols of cherries, bells and lemons turn up by just pushing plunger. You can play for hours. It's fun! Wonderful for parties, games, etc. Hit the "jackpot" and gather in your chips.

Sent to you complete with chips and instructions. Durably made of heavy pressed steel. Take it wth you on trips or use it at parties for amazing enjoyment. Guaranteed to please or REFUND OF PURCHASE PRICE IN 5 DAYS.

SEND NO MONEY — RUSH COUPON

FIFTH AVE. MDSE. MART, Dept. PLB31
150 Nassau St., New York 7, N. Y.
Send complete "POT-LUCK" outfit by return mail. It is understood if I am not delighted after 5 days, I may return for full refund of purchase price.

( ) Send C.O.D. I will pay $2.98 plus postage.
( ) Enclosed find $3.00 in full payment.
( ) Send 2, special price $5.50 plus postage.

Name.....
Address.....
City.....Zone.....State.....

INVENTIONS WANTED AT ONCE

Patented or unpatented inventions, all types needed by manufacturers. Write for free booklet "MARKETING YOUR INVENTION" and Protective Disclosure Form. We have a tremendous list of firms who may pay cash or royalties for good inventions. For full particulars, write today.

NATIONAL INVENTION SERVICE
1404 Mitchell Street, Dept. B — Oakland 1, Calif.

SCREEN PROCESS PRINTING LEARN AND EARN AT HOME!

WITHOUT PREVIOUS ART EXPERIENCE

1. LEARN BY DOING
2. ANYONE CAN LEARN
3. UNCROWDED FIELD
4. NO MACHINERY
5. IN GREAT DEMAND
6. A BUSINESS OF YOUR OWN

3 WAY Home Study Course Shows How To

1. START YOUR OWN PROFITABLE BUSINESS. 2. GET A GOOD PAY JOB. 3. EARN EXTRA MONEY IN SPARE TIME.

2 BIG KITS are yours at no additional cost. Complete in every detail. Every item needed to complete the course included.

No machinery. Print thru stencil mounted on silk stretched frame.

WRITE FOR FREE BOOK NOW!

CALIFORNIA SCHOOL OF SCREEN PROCESS
3740 OVERLAND BLVD., DEPT. S28, LOS ANGELES 34, CALIF.

VETS: APPROVED UNDER G. I. BILL

CANVAS COVERS Waterproof tarpaulins, war surplus (Used), perfect condition. Originally made for tents. Approx. 5'x8'. Two buttoned together make approx. 80 sq. ft. Complete with buttons attached. Suitable for use as canvas dams, hay covers, truck covers, machinery and equipment covers, etc. Packed in bales 40 each, priced 40 covers, **$1.00** ea; 15 covers, **$1.50** ea. Less than 15, **$1.75** ea. All FOB, Kansas City.

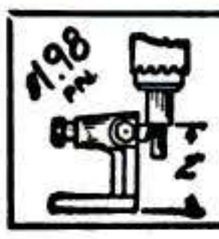
AMERICAN SUPPLY CO.
329 W. 5th — Dept. P. S. — Kansas City, Mo.

WHY WEAR DIAMONDS

When dazzling Zircons from the mines of the far-away mystic East are so *effective and inexpensive?* Thrilling beauty, stand acid, true backs, flashing brilliance! Exquisite gold mountings. See before you buy. Write for **FREE** catalog.

National Zircon Company Dept. 42-N Wheeling, W. Va.

Catalog FREE!



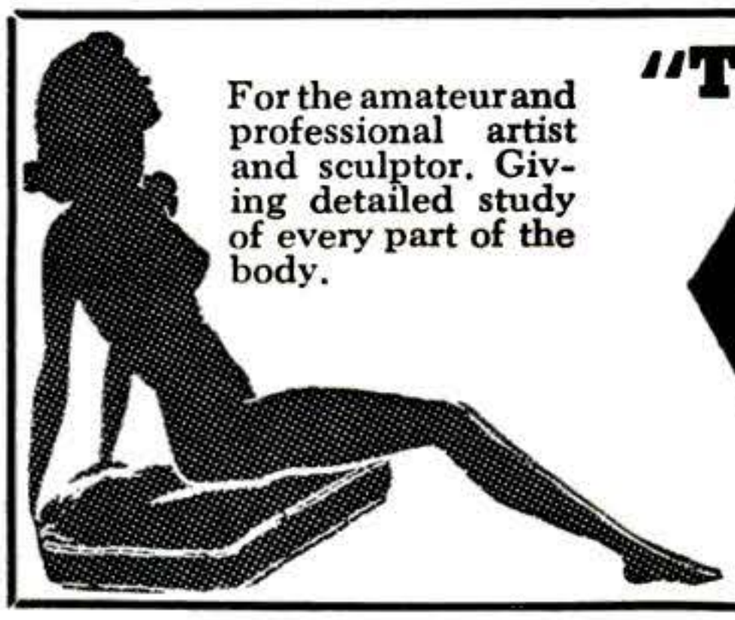
TURNING ON DRILL PRESS

A real tool—complete—turn wheels—studs—shoulders—forms—face, etc. Precision made. Literature. Price **$1.98** postpaid.
BRAEMER PRODUCTS, BOX 2636, LAKEWOOD, OHIO

MAKE EASY MONEY IN YOUR SPARE TIME

Popular Science Magazine has a limited number of openings for agents to sell subscriptions to this famous magazine—in all parts of the country. Our regular part-time agents make amazing commissions by representing the magazine that sells itself. If you too want to make easy spare-time money, just print your name and address on the back of a penny postcard and address to—*Manager of Agents, Dept. 82S, Popular Science Publishing Co., 353 Fourth Ave., New York 10, N. Y.*

Say You Saw It In Popular Science



For the amateur and professional artist and sculptor. Giving detailed study of every part of the body.

"The Book They're Talking About"

Contains over 300 illustrations, charts and notes

ART ANATOMY OF THE HUMAN FIGURE

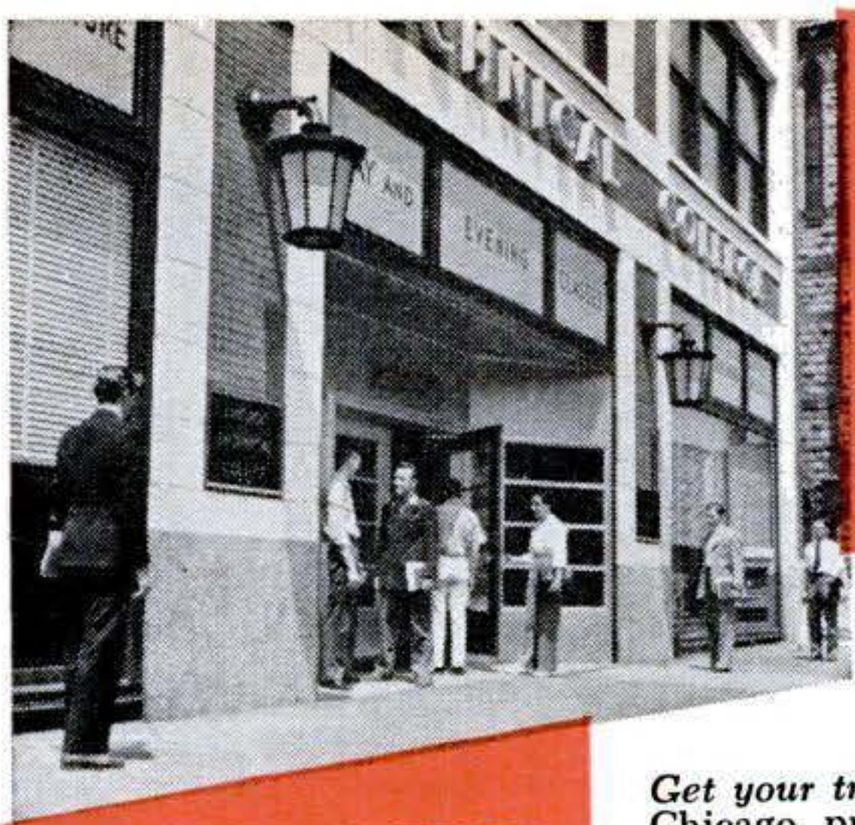
MALE AND FEMALE, POSED AND IN ACTION

(Sent in plain wrapper.) Outside of U. S. A. Send $1.25

MAJOR BOOK CO., DEPT. 520-B, LYNBROOK, NEW YORK

ONLY $1.00

Copyrighted material



Learn ENGINEERING DRAFTING...BUILDING in Chicago, Industrial Hub

Approved For G. I. Training **Time-Saving Courses** **Day & Evening Classes**

1 YEAR • 2 YEAR
3 YEAR COURSES

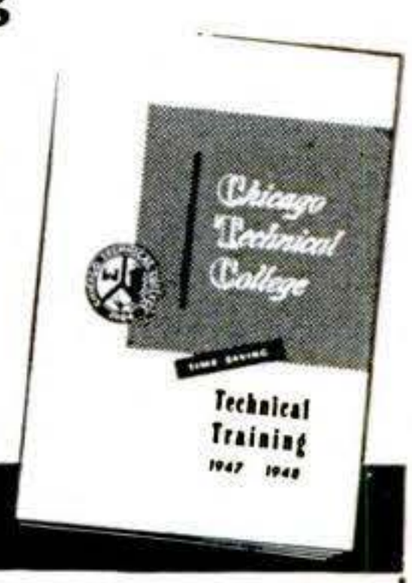
BUILDING
DRAFTING
ENGINEERING
AIR CONDITIONING
REFRIGERATION
ELECTRICITY
RADIO

Get your training at Chicago Tech in the Nation's industrial center. Chicago provides unequalled opportunities for part-time employment while training and for permanent positions upon graduation. Many other cultural and recreational advantages described in Catalog,—sent Free!

Chicago Tech, founded 43 years ago, has trained thousands of men now occupying important places in industry the world over. Training combines theory and practice in 1 year, 2 year, and 3 year (Degree) courses. Saving in time means earlier graduation,—and consequently earlier employment.

Terms start January, April, July and October. Get information now to arrange for early admission and accommodations.

CHICAGO TECHNICAL COLLEGE
B-87 Tech Bldg.
2000 So. Michigan Ave.
Chicago 16, Ill.



MAIL COUPON TODAY

Chicago Technical College
B-87 Tech Bldg., 2000 So. Michigan Ave.
Chicago 16, Ill.

Please send me without obligation free booklet on Time-Saving Technical Training.

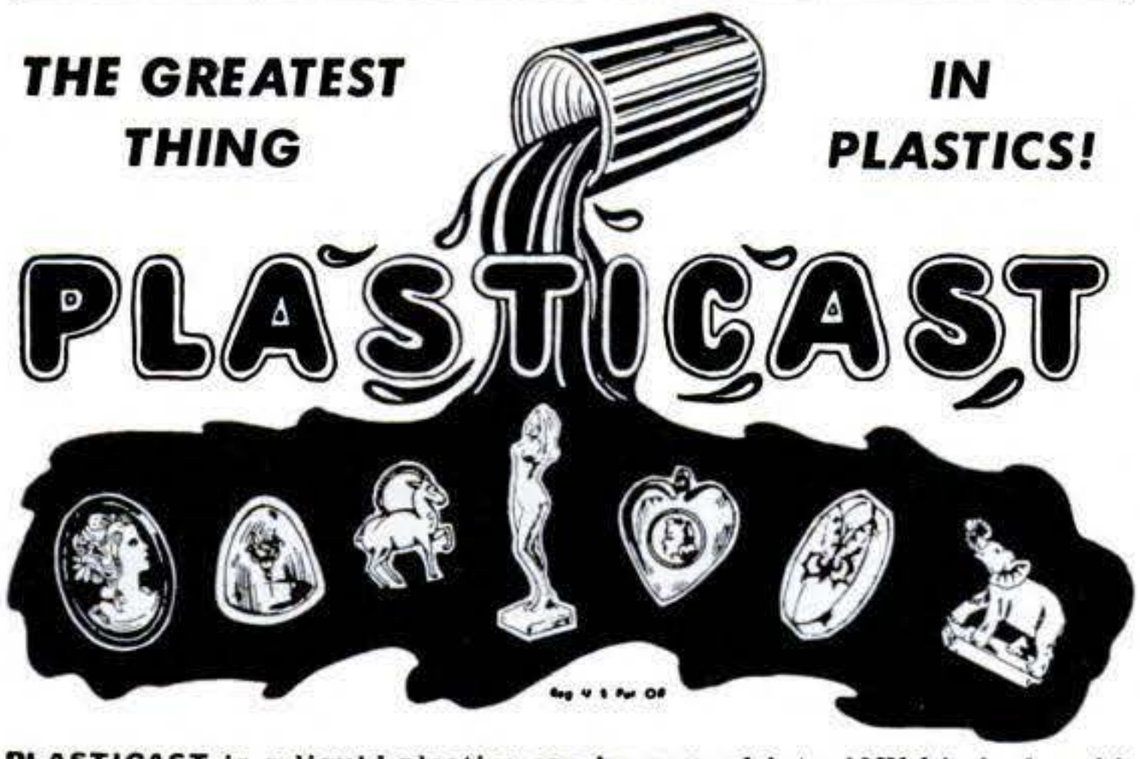
Name.....Age.....

Address.....

City.....Zone...State.....

THE GREATEST THING IN PLASTICS!

PLASTICAST



PLASTICAST is a liquid plastic; can be poured into ANY kind of mold or container. Hardens in a few minutes into a transparent solid, clear-as-glass, tough-as-steel plastic! No tools or machinery required. Ideal for imbedding flowers, butterflies, photos, souvenirs, and for making beautifully brilliant jewelry, gems, displays, fishing lures, magnifiers, lenses, knick-knacks and novelties. Easily cast into sheets, rods or blocks, ANY shape, ANY color. **EVERYTHING FURNISHED** including **4 MOLDS** for making over 200 attractive articles! C.O.D. orders accepted with $1.00 deposit. Postpaid U.S.A. & Canada only.

COMPLETE MASTER OUTFIT—$3.25

PLASTIGLASS

Make Beautiful, Colorful Ornaments, Jewelry, Butterflies, Flowers, Birds, Tropical Fish, Corsages and Novelties simply by bending wire and dipping into **PLASTIGLASS!** No heat, catalyst or tools required. Complete outfit for making hundreds of remarkably beautiful glass-like novelties, only **$4.00 ppd.**

FREE

SPECIAL OFFER

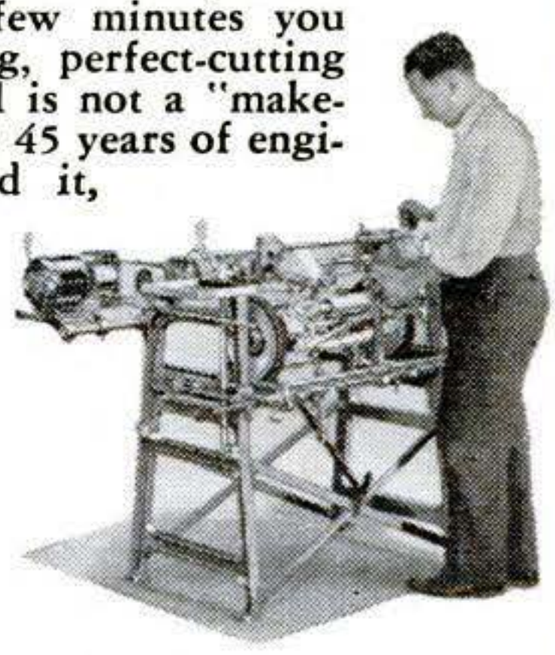
A very attractive and useful novelty made with one of our products given absolutely free with every one of our catalogs! Catalog lists hundreds of new materials for making **MOLDS** and **CASTINGS** with Liquid Plastics, Liquid Ivory, Liquid Marble, Wax, Latex, Metal, Castwood, etc. Big selection of rubber molds. Price of catalog only 10c coin or stamps.

PLASTICAST CO., (Dept. A)
5961 Madison St. *(Send order to nearest address)* **P. O. Box 987**
Chicago 44, Illinois **Palo Alto, Calif.**

You Can Make Up to $5.00 Per Hour with the IDEAL

THERE are hundreds of lawnmowers in your neighborhood that will need sharpening at least once or twice each season. You can build up a profitable business with the Ideal Lawnmower Sharpener, and earn up to $5.00 an hour while doing it.

You need no experience to operate the Ideal Lawnmower Sharpener. Just place the lawnmower in the Ideal, make a few simple adjustments, and in a few minutes you have a smooth-running, perfect-cutting lawnmower. The Ideal is not a "makeshift" sharpener, it has 45 years of engineering design behind it, . . . is sturdily built, and grinds both straight blade and reel knives to a precision-cutting edge. Write today and learn what the Ideal Lawnmower Sharpener can do for you.



DON'T DELAY

Send For FREE Book

The FATE-ROOT-HEATH CO.

DEPT. D-4, PLYMOUTH, OHIO

Copyrighted material

Learn A Trade NOW!
PRACTICAL SHOP TRAINING!

In Our Chicago Shops

- ☐ AUTO MECHANICS
- ☐ DIESEL MECHANICS
- ☐ REFRIGERATION
- ☐ WELDING—ARC and GAS
- ☐ MACHINIST
- ☐ PIANO TUNING

America's Leading Practical School
7 Floors of Fully Equipped Shops
Over 45,000 Graduates
Expert Individual Instruction
Learn by Doing—Low Living Expense
Established 1902—Day and Evening Classes
Above Approved For G. I.'s and Civilians

Also the following Home Study Courses

- ☐ PLASTIC
- ☐ REFRIGERATION
- ☐ BODY AND FENDER
- ☐ DIESEL
- ☐ TOOL AND DIE DESIGN

—CALL IN PERSON OR MAIL THIS AD TO—

GREER SHOP TRAINING

(Dept. 118) 460 South State St., Chicago 5, Ill.

Please send without obligation free information regarding trade checked above. (Specify whether you are a Veteran ☐ or Civilian ☐)

Name_____ Age____

Address_____

City_____ State____

TRAINING "with-a-purpose" AT WRCI

Four well-equipped laboratories provide the **PRACTICAL** training essential to a successful career in Radio Communications (FCC licenses) or in Radio-Television Servicing (Technician). Train under supervision of technical specialists with **COMMERCIAL** type equipment. Investigate **WRCI SPECIALIZED TRAINING** methods before selecting a school. Free, illustrated booklet upon request. Available for non-veterans—approved for veteran training.

WESTERN RADIO COMMUNICATIONS INSTITUTE
631-A West Ninth St. Los Angeles 15, California

BIG MONEY FOR YOU!

Just Telling Property Owners About
ZONE HEAVY-DUTY ROOF COATING

Sensational product cuts essential building repair cost up to 75%. Amazing demonstration gets orders in a hurry. Only six average orders a week can pay you well over $190.00!! Complete FREE selling outfit includes everything you need to make big money right from the start. If 30 or over, this may be the opportunity of your life. Tell about yourself. Write, Jack Canning, Vice Pres.

ZONE Company P. O. BOX 789, DEPT. B-13 FORT WORTH 1, TEXAS

LIQUID MARBLE — PLASTIC IVORY

Mold, Brush, Trowel, or Spray It!

Mold Novelties, Statuary, Art Goods in **Flexible Plastic Molds.** 5c material makes $1 seller. Make **Marbleized floors,** tile walls. Colorful, glossy, amazing! Easily learned; start in garage or basement. Particulars free.

RAPID MARBLEIZING SERVICE, Dept. 15-E, Edwardsville, Illinois

New! HANDY WRENCH SET

COMPLETE SET FOR RADIO, HOBBY, GENERAL USE

Hollow handle holds screw driver and 5 wrench sockets. Sizes 1/4", 5/16", 3/8", 7/16", 1/2". High grade steel with case hardened sockets. 7 1/2" long with easy grip knurled handle. Never before a set of this quality and precision at such a low price. Your money back if not satisfied. C.O.D. $2.00 plus postage or send $2.00 and we pay postage.

M. G. Sales Co. 1187 Bedford Ave. Brooklyn 16, N.Y.

FIELD JACKETS

- 100% Wool Lined
- Water Repellent
- Zipper Front
- Adjustable Hip Straps

$1.98

SIZES: 32, 34, 36, 38 and 40

Full zipper-front Army Field Jacket with bi-swing back. Every one is guaranteed to be in perfect condition. They have been cleaned, sterilized and washed. These jackets were used and reconditioned for service to servicemen overseas. Positively safe from tears or rips. Add 20c postage; Illinois Residents add 2% tax.

Send no money, pay postman $1.98 plus postage
WORLD WAR SURPLUS STORES, Dept. PS
841 S. BLUE ISLAND AVE., CHICAGO 7, ILL.
Allow 10 Days Delivery

CONFIDENTIAL LOAN SERVICE

Borrow $50 to $300.00

Need money? No matter where you live you can borrow **BY MAIL** $50.00 to $300.00 this easy quick *confidential* way.

BY MAIL

IT IS EASY TO BORROW BY MAIL!
Completely confidential and private
CONVENIENT MONTHLY PAYMENTS

NO ENDORSERS NEEDED

EMPLOYED MEN and women of good character can solve their money problems quickly and in privacy with loans **MADE BY MAIL.** No endorsers or co-signers. We do not contact employers, friends or relatives. Convenient monthly payments. Send us your name and address and we will mail application blank and complete details FREE in plain envelope. There is no obligation.

STATE FINANCE COMPANY

216 Savings & Loan Bldg., Dept. B-13, Des Moines 8, Iowa

Copyrighted material

MONEY SAVING SURPLUS BARGAINS

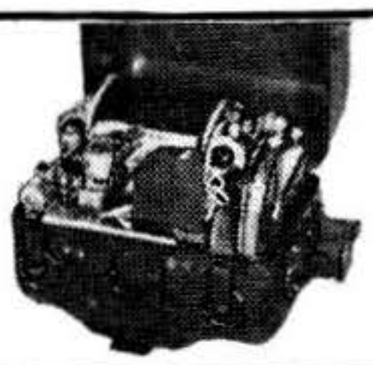
GENERAL ELECTRIC
BC645

TRANSCEIVER

A brand new Transmitter-Receiver covering 450-500 MC. Ideal for use in proposed citizens band between house, and car, boat, etc. 15 tubes alone cost $58.00. Complete with conversion date for 110 VAC operation in sealed GE carton.

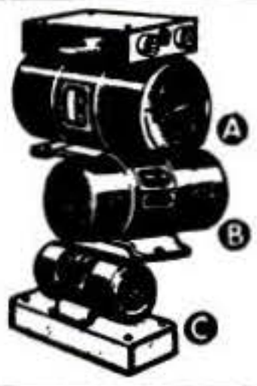
$14.95 2 for $27.00 Add postage for 25 lbs....

GN58 GENERATOR



Makes excellent home lighting plant, operated by wind propeller, waterfall, gas engine, or hand crank. Reduction gear allows full output at slow speed; supplies 6 volts at 2.45 amp., 425 volts at .115 amp. New. Add postage for 28 lbs. **$7.95**

DYNAMOTORS



Dynamotor A—Input 12 volts, output 1000 volts at 350 MA. Shipping weight, 72 lbs..... **$7.95**

Dynamotor B—Input 6 or 12 volts, output 500 volts at 160 MA. Shipping weight, 30 lbs..... **$5.95**

Dynamotor C—Input 28 volts, output 220 volts at 60 MA. Add postage for 6 lbs..... **$1.50**

BRAND NEW ARMY AIR FORCE

ASTROGRAPHS With Case

New B29 navigation instrument which can easily be used to make a good contact printer, strip map holder, etc. The plywood case 14½"x11"x10" high is perfect as a tool kit, camera, projector case or for building a portable phonograph picnic kit, make up case, etc., has leather handle reinforced covers, 8 covered compartments in bottom. Cost Gov't $125.00. Add postage for 20 lbs.

Only **$3.95**

HEATHKIT

AMPLIFIER KIT

Complete kit to build excellent 25 watt amplifier, ideal for P.A. system, phonograph amplifier, etc. Push pull circuit using best parts. Supplied with 4 tubes, punched chassis, blueprints and instructions. Add postage for 25 lbs.

$14.95

G.E. BC375

TUNING UNIT

A beautifully constructed tuner containing the best in variable condensers, coils, vennier dials, etc., at least $30.00 worth of parts, complete with conversion instructions to transmitter and receiver. Add postage for 20 lbs.

$2.49

HEATHKIT

TRANSMITTER KIT

Complete kit for building a fine amateur transmitter includes every part—tubes, cabinet, 80 meter coil, crystal, blueprints and instructions, less power supply. Add postage for 30 lbs.

$19.50

HEATHKIT VACUUM TUBE

VOLTMETER KIT

Build yourself this beautiful Electronic AC and DC voltmeter and ohmmeter ranges 3 volts to 1000 volts and to 1000 megohms. Every part supplied including blueprints. Add postage for 8 lbs. **$24.50**

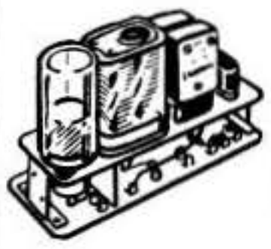
MINIATURE HEADPHONES

$1.00 Hearing aid type, comfortable, keeps out outside noise, one of the army's best types.. Add postage for 2 lbs.

THROAT MICROPHONE

Used by army in noisy applications in aircraft, tanks, etc. Many interesting home uses. Add postage for 1 lb.... **$1.00**

WALKIE-TALKIE UNIT



$1.00 BC746 Tuning Unit contains two crystals, receiving coil and condenser and transmitter tank coil, fine for radio builders. Add postage for 1 lb.

T32 TABLE MICROPHONE

One of the army's finest built by Kellogg. Ideal for public address, transmitters, etc. Add postage for 5 lbs..... **$2.95**

POCKET TESTER KIT

$2.95 Build this AC and DC voltmeter and save 2/3 the cost. Includes 2½" meter, resistors, rectifier, and mounting. Reads 0 - 3 - 30 - 300 VDC and 0 - 300 VAC, instructions. Add postage for 2 lbs.

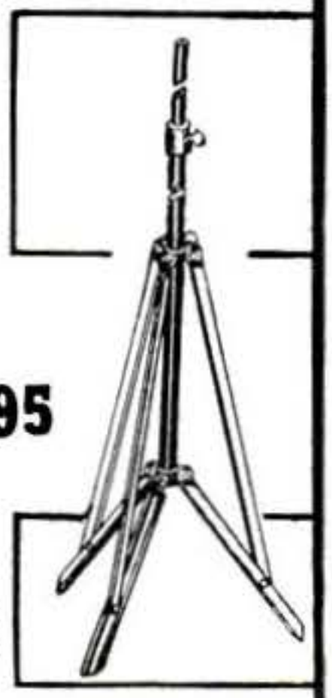
RADIO BUILDERS' KITS

Power supply kit to convert army radios to 110 VAC	$5.95
5" P.M. loudspeaker for army radios	$2.80
Experimenter's Kit, 5 lb. of radio parts for	$1.00
Kit of 20 radio tube sockets for	$1.00
Kit of 20 Bypass bathtub condensers	$1.00
Kit of 10 radio volume controls	$1.95
Kit of 10 Midget variable condensers	$1.95
Kit of 100 color coded insulated resistors	$1.95

G.E. CIRCUIT BREAKER

$2.95 Protect your electrical equipment, eliminate fuses. 50 AMP 220 Volt rating. Add postage for 4 lbs.

ARMY TRIPODS



Excellent for floodlights, screens, etc. Raises to 12 ft., folds to 5 ft. Rugged construction. Express shipment only **$4.95**

MINIATURE MOTOR

$2.95 24V.D.C. size 1¼"x 1"x2". Add postage for 1 lb.

Power supply kit to convert motor to 110 V.A.C. Add postage for 6 lbs. **$2.49**

NO ORDERS under $2.00

The HEATH COMPANY
DEPT. S . . BENTON HARBOR, MICH.

Copyrighted material

WANT A BEAUTIFUL LAWN?

READ *Lawn Care*

This bulletin service comes by mail to your home with timely hints on all vital lawn problems such as weed control. For a FREE two year subscription, write your name and address on a post card and say, "LAWN CARE, please."

O M *Scott* & SONS COMPANY
98 Spring Street • Marysville, Ohio
Also Ridgefield, N. J. and Palo Alto, Calif.

ITALIAN ACCORDIONS

Hand Made. Very Best. Lowest Prices. Buy Direct from Factory Representative and Save Money. Send Name and Address for FREE catalog.

ITALIAN ACCORDION MFG. CO.
7600 Cottage Grove Ave., Dept. PS-2, Chicago 19, Ill.

KEEP WARM

(Left) **B-15 STYLE PILOT'S JACKET.** Water repellent green poplin; wool alpaca body & sleeve lining; 2 slash pockets; Genuine Mouton Fur Collar, zipper front. 36-46 .....**$15.50**

(Right) **AAF F-2 PILOT'S JACKET.** Eisenhower style with soft shearling collar; 100% wool; dark green. Complete with all wool button-in liner; zipper front. Wear liner as separate jacket. Sizes 36-40. **$11.75**

Leather Pants. Sheepskin lined. Navy surplus. Suspenders **$6.75**

Write for FREE illus. list Army surplus. Orders sent postpaid except C.O.D. **Satisfaction or Money Back.**
CONSUMERS CLOTHING CO., Box 2-S, 26 Greene St., New York 13

Refit and Tighten FALSE TEETH

With AMAZING **PLASTI-LINER**

If your plates are loose and slip and hurt; reline them better than new, with this pliable, non-porous strip. **Just lay on plate, bite and it molds perfectly,** hardens for permanent fit and comfort. Ends forever the mess, bother, expense, of temporary applications that last only a few hours or few months. PLASTI-LINER is tasteless and odorless. Will not injure plates. **Guaranteed to give satisfaction or your money back.**

Easy-To-Use Plastic Strips Re-Fit False Teeth Perfectly

Here's what users say: "Until I used PLASTI-LINER I used several kinds of liners without success. Now **I can eat anything.**" H.S.M. "My plates now **fit better than when new.**" E.H.C.

SEND NO MONEY Just order a $2.25 package to reline both upper and lower plates or $1.25 for one plate. Deposit the money with your postman when it arrives, or send money now and **save C.O.D. charges.** Trial size plate cleaner **free.**

PLASTI-LINER CO., Dept. 41-B Buffalo 2, N.Y.

ART STUDENTS

SHOW YOUR OWN MOVIES AT HOME OF BEAUTIFUL HOLLYWOOD MODELS

Art Films Suitable for Study of Effective Lighting & Composition

50′ 8mm $1.25
200′ 8mm 5.00
100′ 16mm.... 5.00
400′ 16mm....10.00

• FIGHT PICTURES (1 reel ea.)

Louis vs. Baer — Dempsey at His Best
Louis vs. Schmeling — Louis vs. Braddock

• COMEDIES (1 reel ea.)

The New Janitor, Charlie Chaplin — At the Ringside...Snub Pollard
Between Showers, Charlie Chaplin — Uncovered Wagon...Paul Parrot
In the Park.....Charlie Chaplin — Grab the Ghost.....Hal Roach

• FULL LENGTH FEATURES

title	star	reels
Lady Windermere's Fan	Ronald Colman	6
The Americano	Douglas Fairbanks	5
In the Navy	Wallace Beery	5
Covered Wagon	Alan Hale	6

Prices for Fight Pictures, Comedies, Full Length Features: 200 ft. 8mm at **$4.** per reel. 400 ft. 16mm at **$8.** per reel. **SEND NO MONEY—WE SHIP C.O.D.—PAY POSTMAN.**

EIGHT SIXTEEN FILMS, Inc.
630 Ninth Ave. New York 19, N. Y.

SOCKET SET

Made by Plomb Tool Co., set #4700A, 7/32″ to 7/16″ inclusive. 9 different sizes, 2 holders. In metal box. Each..... **$4.95**

WORK BENCH

All Steel With 3 Drawers

Used—But Excellent Condition (Govt. Surplus). A Heavy duty steel bench, 36″ wide x 36″ high x 72″ long. Suitable for every type of bench work, home workshop, etc. Top 1/8″ steel plate, 2 1/2″ Angle iron legs. Shipping weight 340 lbs. They are not crated or knocked down. Prices F.O.B., K. C..... **$36.30**

Special Quantity Discounts. Write for Our New Catalog.

ATLAS SALVAGE & EQUIPMENT CO.
229 Sw. Blvd. Kansas City, Mo.

Please Mention Popular Science When Writing Advertisers

LOOK TALLER *INSTANTLY!*

WEAR HITE-BUILDERS IN YOUR OWN SHOES

Want more respect?...more opportunities? Then increase your height INSTANTLY with Davis Hite-Builders. Slip them inside your own shoes. Invisible . . . comfortable . . . easy to wear. Made to last for years. Amazingly low-priced!

SEND NO MONEY

Rush name, address, and shoe size today. Pay postman only $1.95 plus few cents postage for your pair of Hite-Builders, mailed in plain package. If not delighted with immediate result, just return them and we'll refund your money at once. Or send $1.95 now and save postage. Same guarantee...of course. Order today, look *TALLER* next week!

DAVIS MFG. CO.
DEPT. G-341, LOVELAND, OHIO

Only **$1.95 A PAIR**

Copyrighted material

$200 GROSS IN MY FIRST WEEK!

Some Make More, Some Less . . . Start This Business for YOUR OWN

FREE BOOK! MAIL COUPON

VON SCHRADER MFG. CO.
A-283, Racine, Wis.

Send at once (no obligation) your FREE booklet containing information about your Electric Rug Washer and how I can own my own permanent, profitable business.

Name_____

Address_____

City_____(Zone)____State_____

Would YOU like to own a permanent, year-round business in which it is possible to take in as much as $200 gross the first week, as did L. A. Eagles? R. E. Traynor says, "I made $62 gross in one day." R. R. Newlin reports, "I have averaged $173 gross per week." Others report gross from $100 per week to $12,000 per year.

Surely YOU will want to investigate a golden opportunity like that. You need not have any special skill or experience, but if you are ambitious, honest and courteous, we will help you to start and succeed in YOUR OWN money-making business where net profits are high.

No Shop Necessary

Our Electric Rug Washer cleans rugs and carpets like new right on the customer's floor. This quick, thorough and highly efficient method removes dirt and grime, thus restoring the natural, fresh beauty of floor coverings. Anyone can run it. Rugs and carpets are not harmed.

There are hundreds of possible customers in YOUR vicinity. Most of them have several rugs needing **regular** cleaning. To get a quick start, shampoo a few rugs or carpets. These customers tell their friends and soon you should have an independent, prosperous business, and you should be able to keep it growing. Send the coupon RIGHT NOW for booklet that explains everything.

Every Machine Guaranteed and Easy to Own

You take no risk. These wonderful, fully guaranteed machines have been used and endorsed by largest hotels, railroads—also used by U. S. Government. Many individuals have built up successful businesses that made big profits. Mail the coupon TODAY and we will send complete information, including how to start and succeed in YOUR business **without a large investment.** Don't delay your BIG opportunity. Send the coupon AT ONCE.

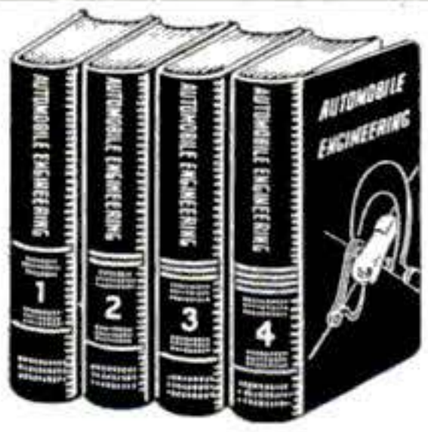
MAIL COUPON TO VON SCHRADER MFG. CO., A-283, RACINE, WIS.

Say You Saw It In Popular Science

No other adding machine can match all its advantages!

Adds, subtracts direct, multiplies—**quickly, accurately. So easy to operate**—no practice necessary. The perfect **portable**—11½x2½ in. size, weighs only 14 oz. Eight-column ($999,999.99) **capacity**-models also to handle in fractions, feet and inches. Over **100,000 in use**—praised everywhere. Only $12.95 postage prepaid—10 day money-back **guarantee** if not fully satisfied. Complete descriptive folder on request—or, **send check or money order NOW.**

Reliable Typewriter & Adding Machine Co.
Dept. F-2, 303 W. Monroe St. Chicago 6, Ill.



AUTO BOOKS ON APPROVAL

CAN YOU FIX IT?

These wonder books tell step by step HOW to make difficult repairs and adjustments, how to keep a car at maximum efficiency, including latest improvements in car design and operation. Engine troubles and how to correct them well covered.

4 BIG, THICK VOLUMES

Over 2700 pages, 2000 illustrations, wiring diagrams, etc., including **Diesel engines.** Beautiful modernistic, washable cloth binding.

SEND NO MONEY. Just mail the coupon for a complete set of 4 Big, Thick Auto Books. 20th Edition. Over 2700 Pages! Whether you are a mechanic or helper, expert or apprentice, auto owner or driver, take immediate advantage of this FREE EXAMINATION OFFER.

MAKE GOOD MONEY NOW HOLD A PERMANENT JOB

America wants its automobiles kept in good repair. Men with "know how" are in demand, at big pay. These books will help you get and hold an important job, or give you a chance to go into business for yourself now or later. Any man who half tries to improve himself can learn auto servicing and repairing by this quick reference method. Use the JIFFY INDEX to find easily understood answer to any auto problem. These wonder books prepared by eleven of America's great automobile engineers. Many hundreds of valuable illustrations. Send the coupon TODAY.

[A year's consulting privileges with our engineers now given with these books without extra charge.]

Vocational Publishers Since 1898

AMERICAN TECHNICAL SOCIETY. Dept. A220
Drexel Ave. at 58th St., Chicago 37, Ill.

I would like to examine your 4 Volume Set of Auto Books. I will pay the delivery charges only, but if I choose I may return them express collect. If after 10 days' use I prefer to keep them, I will send you $2 and pay the balance at the rate of only $3 a month until $24.80 has been paid. Include consulting service as offered above.

Name.....

Address.....

City..... State.....

Please attach letter stating age, occupation, employer's name and address, and name and address of at least one business man as reference. Men in service, also please give home address

Copyrighted material

MAKE BIG MONEY IN LIQUID SYNTHETIC MARBLE

FEW DOLLARS STARTS YOUR OWN PROFITABLE BUSINESS!

Here are 3 amazing, new opportunities to get into your own highly-profitable, dignified business—without previous experience—regardless of your age or sex. **1. LIQUID Synthetic MARBLE**—Easy to make and install beautiful synthetic Marble Slabs—pouring from liquid state. Big Demand for kitchen and bathroom walls, etc. **2. FIBRE-TITE FLOORING**—Easy to make and install—in any color or color combination. Many years wear. Dustproof. Soundproof. Verminproof. **3. FLEXIBLE MOLDS**—for Plaster Casting. $1.00 in raw materials makes up to $25 worth finished products. F. B., Iowa, writes: "Am on job that will net me $150 for 4 days work." Get FREE details. No obligation. Write today!

Write for FREE DETAILS NOW!

COMPOSITION PRODUCTS CO.
5853 Delmar Blvd. Dept. 22 St. Louis 12, Mo.

Earn BIG PAY Now!

thousands of ambitious men helped

FREE EMPLOYMENT SERVICE • **BIG SHOP TRAINING** •

Choose one of these **8 LEADING TRADES**

- Machinist Trade
- Tool & Die Making
- Tool & Die Machine Designing
- Mechanical Drafting
- Tool Engineering
- Production Illustration
- Industrial Product Design
- Structural Drafting

Largest School of its Kind in the World

FREE! BIG METAL TRADES ILLUSTRATED BOOK

VETERANS—The Allied School is Approved by: United States Veterans Administration.

WRITE TODAY: A 1c Postcard will do.

ALLIED SCHOOL OF MECHANICAL TRADES
1338-1340-1342 So. Michigan Ave.
442 Allied Bldg. CHICAGO 5, ILL.

LAWN ORNAMENT-NOVELTY PATTERNS

28 Lawn Ornament Patterns, 25c, Other patterns: 15-20" high; Dutch Girl, Dutch Boy, Pirate, Bull Terrier, Mexican Girl, Mexican Boy, Dwarf, Penguin, Flower Girl, 10c each. 25 Novelty Patterns, 30c. **All 62 Full Size Patterns, $1.00 Postpaid.**
Strother Pattern Service, Dept. 7-AB, Box 383, Belington, W. Va.

Ugly BLACKHEADS OUT IN SECONDS

Keep your complexion free of Blackheads this new way — look attractive instantly!

***Try* VACUTEX Blackhead-Remover**

$1.00

The amazingly effective Vacutex extracts Blackheads automatically—WITHOUT squeezing the skin or injuring tissues. Easy to use with three fingers. It reaches Blackheads anywhere. Try it 10 days and if not delighted, return VACUTEX and your money will be refunded.

At Your Dealer or Use Coupon

10 DAY TRIAL COUPON

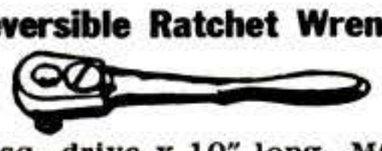
BALLCO PRODUCTS CO., Dept. A-1102
19 West 44th St., New York 18, N. Y.

☐ Enclosed find $1. Send postpaid.
☐ Send C.O.D. I will pay postman $1 plus postage; $1 refund if not delighted.

SORRY. NO C. O. D.'s OUTSIDE U. S. A.

WAR SURPLUS BARGAINS

Reversible Ratchet Wrench



½" sq. drive x 10" long. Mfg'd. by New Britain, polished. Each..... **$3.20**

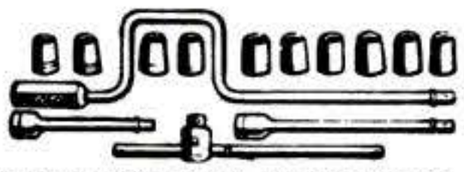
9 Piece Spark Plug Socket Set

Mfg'd. by Duro Chrome, ½" Drive, 12 pt. extra deep to reach deep recessed spark plugs, also ideal for other work where a long reach is necessary. Sizes ½", 9/16", ⅝", 11/16", ¾", 25/32", 13/16" and ⅞". Also ell handle and metal box. Each..... **$4.25**

Electric Soldering Iron

"HEXACON" 200 Watt 115 volts A.C. & D.C. Each..... **$4.20**

14 Piece Socket Wrench Set



½" Drive standard wrench parts of popular brands in cardboard box consisting of speeder wrench, sliding handle, 5" and 10" extensions, 10 assorted 12 pt. sockets ½" to 1". Each..... **$5.30**

ORDER TODAY—WE PAY THE POSTAGE!

INDUSTRIAL SUPPLY COMPANY | 312 EAST 33rd ST. NEW YORK 16, N. Y.

Learn MASONRY CARPENTRY

Write for "Free" Catalog

In a few short weeks you can be making big money in the building trades. Learn now while opportunities are greatest. Prepare for the future. You receive your training in our completely equipped shops under expert instructors. Fully approved for G.I. Training.

MIDWEST SCHOOL OF BUILDING TRADES
Dept. A-22 411 N. Center Street Bloomington, Ill.

NEW 30" SHEET METAL BRAKE

Forms angles, channels, vees, flanges, locks, zees, boxes. Handles 26 gage sheet steel, heavier gages of aluminum, copper, plastic, etc. Portable. Can be held in a bench vise, or bolted down. All steel construction. Wt. 40 lbs. Shipped exp. collect. ONLY..... **$24.50**

12" BRAKE. Cast iron and steel construction. Price, $14.50 PP.

VISE IRON BENDER. Forms rings, hooks, eyelets, etc. in ½" round or square; ¼" up to 2" wide in bar iron. Price $10.00 PP.

SHEET METAL PLIERS, 2½". Forms angles and channels, $2.00. Sheet Metal and Wire Forming booklet, 50c. All items guaranteed. Order direct. Cash, or C.O.D., or send for folder.

18" Curve Forming Tool. For tapering and straight cylinders, round corners, reverse curves in sheet metal and strap iron, $10.00.

VISE BRAKE MFG. CO., 1318 So. 30th Ave., PS, Omaha 5, Nebr.

NEW 1948 PLASTICS SUPPLIES CATALOG

Just off press. Full details on Plexiglas, Lucite rods, sheets, tubes, Acetates, cements, dyes, buffs, molding sets, tools, carving kits, accessories. Everything in plastics. Gives prices, sizes, colors, etc. Send 6c, stamps or coin, with ad for catalog.

PLASTICS MFG. & SUPPLY CORP.
Dept. S-2 4707 Euclid Ave., Cleveland 3, Ohio

IS YOUR JOB - JUST A JOB?

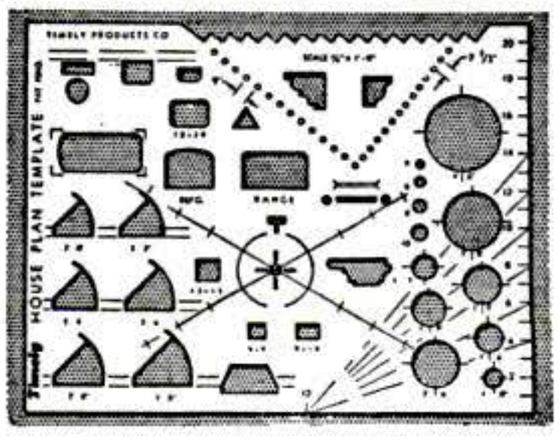
Perhaps you have talents, skills, or abilities that you are not using, talents that are going to waste in your present job! Find out what you are truly interested in, Then . . .

YOUR JOB CAN BE A PLEASURE

HAVE YOUR REAL INTERESTS MEASURED

Scientifically. The test is simple and EASY to take. Be tested today. Send $1.00 now for test.

MIDWEST PSYCHOLOGICAL SERVICES
920 N. Michigan Avenue Chicago 11, Illinois



HOUSE PLAN TEMPLATE

Simplifies Home Planning

Made of clear sheet plastic, with accurate cut-outs for drawing door-swings, plumbing and electric fixtures, fireplace, stairs, molding, roof-pitch, etc. Standard ¼" = 1'-0" scale.

$1.50 POSTPAID

TIMELY PRODUCTS CO.
Box 206L, Columbus 9, Ohio

Copyrighted material

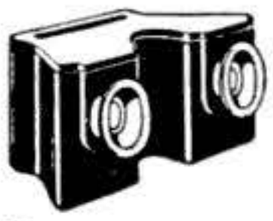
FOR STEREO PICTURES, IT'S

STEREO-TACH!

Take Third Dimension Pictures with the STEREO-TACH and your own camera!

There's nothing in photography so startlingly beautiful and lifelike! You *can't* reproduce a *3-dimension picture* in flat 2-dimension printing!

Outfit No. 101—'Tach and Transparency Viewer (for transparencies, with 35MM cameras) **$22.50***



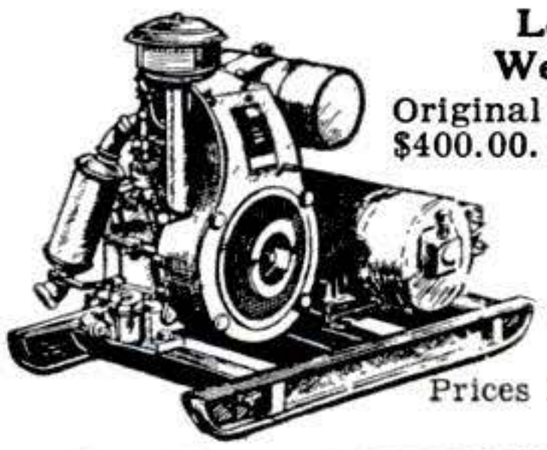
Outfit No. 100—'Tach and Print Viewer (for stereo prints, with both 35MM and other size cameras) *Plus Tax. **$16.25***

The Stereo-Tach

Transparency Viewer For Third-Dimension Projection, the STEREO-FLECTOR! Just Out! *See your dealer or write.*

ADVERTISING DISPLAYS, INC. Dept. PS-12 COVINGTON, KENTUCKY

A. C. LIGHT PLANTS



Lowest Price Ever Offered
We Invite Price Comparison

Original Cost Over $400.00. Now Only..... **$249.50**

2500 Watts 110 AC Volts

Same as R.E. A. or City Current. Nearly new condition. Fully guaranteed. Powered by Briggs-Stratton 6½ hp Air Cooled Engine.

Prices FOB., K. C. Write for Illustrated Circular.

MIDWEST SURPLUS SALES 1520 Locust St. Kansas City, Mo.

BURIED TREASURE, MINERALS
AMAZING NEW GOLDAK LOCATORS

SENSATIONAL NEW MODEL!

ONLY 11 pounds weight! One hand operation! Money-Back Guarantee of Superiority. Write for full details.

THE GOLDAK CO.
1544 WEST GLENOAKS BLVD.
GLENDALE 1, CALIFORNIA

World's largest maker of fine locators.

Bar Bells

Buy Direct From Factory

Write for free booklet and price list

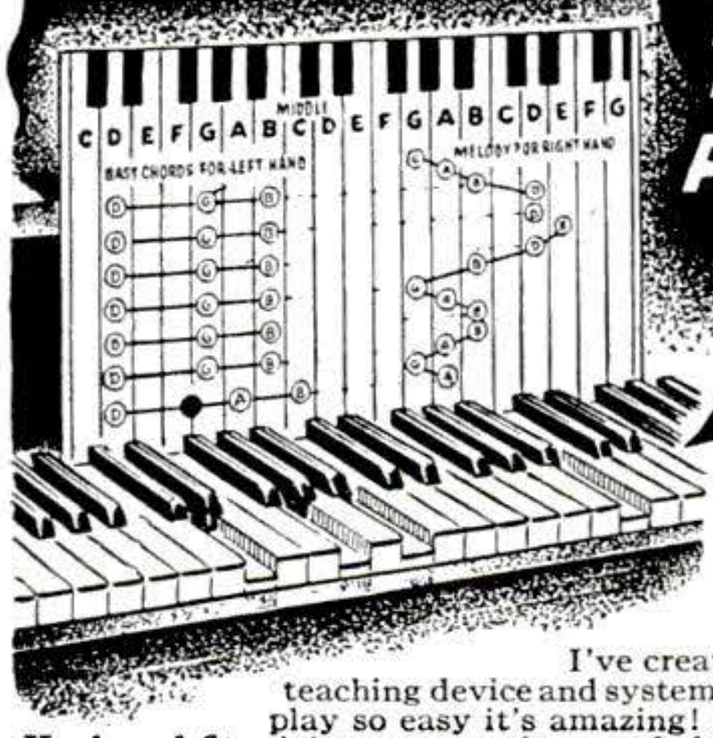
$8.95 up

INDEPENDENT IRON WORKS
2416 East 23rd Street, Dept. C
Los Angeles 11, Calif.

Amazing "Magic Keyboard"

MAKES YOU PLAY PIANO IN AS LITTLE AS 15 MINUTES

FREE TRIAL PROVES IT!



PATENT PENDING

I've created a new piano teaching device and system that makes you play so easy it's amazing! My new Magic Keyboard fits right on your piano and shows you simple as ABC how to play waltzes, hymns, marches, western songs and dance numbers. You play on sight and this offer proves it!

SEND NO MONEY—KEYBOARD COSTS NOTHING

Just send me your name and address and I'll send you my new Magic Keyboard entirely without extra charge with full instructions showing you how to play 3 songs . . . "Home On The Range," "Oh Susannah" and "Long, Long Ago." On arrival you deposit thru postman only $1.49 (50c per song) plus c.o.d. postage. My Magic Keyboard picks out all chords, right hand and left hand, entirely without conventional music notes of any kind. No exercises, no scales, no books . . . no reading page after page of puzzling instructions. Play these three songs instantly to your delight and satisfaction. Convince yourself my new method does teach you to play piano and play it well. Be satisfied beyond all doubt. PLAY or you needn't pay because if I don't teach you to play 3 songs, return the songs in 10 days . . . I'll refund your $1.49 in full and you can keep the keyboard for your trouble! That's how sure I am I can teach you piano with my Magic Keyboard System. Additional songs available month to month as you progress. Send me your name and address today.

DAVE SUTTLE PIANO TEACHER, Dept. 48-B
230 East Ohio Street Chicago 11, Illinois

Raise GOLDEN HAMSTERS

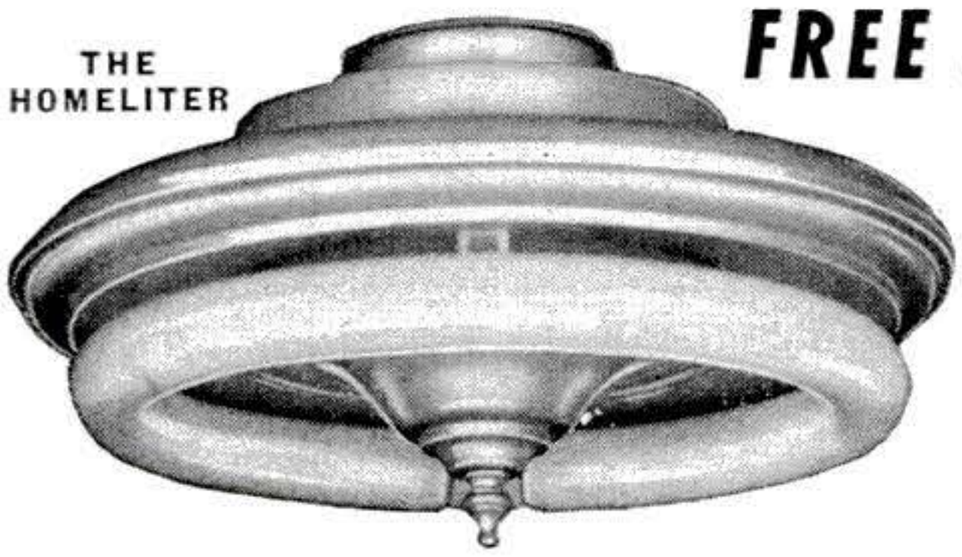
The new wonder animals from Syria. Look like Toy Red Bears. Delightful pets. Everybody wants them. Thousands needed by laboratories. Make money, get started now. Write today for free literature, or send $5.00 for a pair of hamsters and literature.

GULF HAMSTERY 1540 BASIL ST., MOBILE 17, ALA.

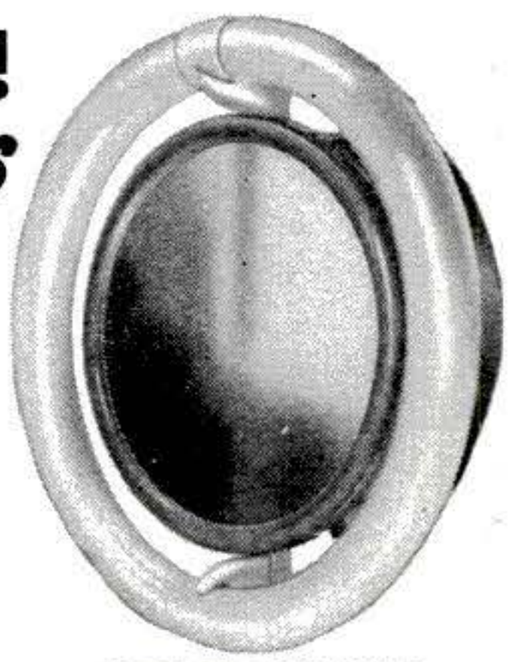
22 Big Money-Makers in a Single Line!

Amazing New Fluorescent Lights with *CIRCULAR TUBES*

THE HOMELITER



FREE SALES OUTFIT • Don't send a penny. Sample Outfit is FREE. Rush name on penny post card for money-making facts about sensational new "CIRCLINE" Fluorescents. Latest scientific development gives you **22** new type circular tube fixtures for kitchens, dinettes, halls, and play rooms. Also Floor and Table lamp for living rooms and pin-ups for shaving and vanity tables. Sells on sight to homes, restaurants, stores, offices. No other fluorescents like CIRCLINE. Salesmen who order samples quickly reorder in large quantities. **All fixtures complete with tubes.** No waiting. Also **immediate delivery** on all standard type Fluorescent Fixtures. This is too good to miss. Big, quick profits waiting. Rush name on post card today for FREE Sales Outfit.



NEW MAXILUME PIN-UP MIRROR LIGHT

MAXILUME COMPANY • 125 W. Hubbard • Dept. 92-A • Chicago 10, Illinois

Copyrighted material

6 NEW GADGETS FOR $1.00

Join the Gadget-of-the-Month Club **today** and receive a new, exclusive, and useful gadget every month for the next six months, postpaid! This coupon and one dollar pays for your six month's trial membership. Ten days after receipt of your order, Gadget-of-the-Month Club will send you the first of the six helpful, handy gadgets, and one each month for the next five months! The total retail price of the six gadgets is **guaranteed** to be far greater than your dollar membership fee, **or your money will be cheerfully refunded!**

JOIN NOW! CLIP this coupon

GADGET-OF-THE-MONTH CLUB
P. O. BOX 2000, LOS ANGELES 54, CALIFORNIA

Name _____

Address _____

City _____

Occupation _____ Age _____

New Advertising Machine

Prints and Illustrates 1¢ Post Cards

FREE Learn *how* thousands of business men, in every line, are boosting sales in spite of conditions—with 1¢ messages—printed and illustrated in a few minutes on gov'nt post cards — with amazing new patented **CARDMASTER.** Your "today's" ideas, read by your prospects next morning. Not a toy, but a sturdy advertising machine, built to last for years. Low price, sold direct. Guaranteed, five years. Send name today.

SEND NAME We'll send **FREE** illustrated book of money-making IDEAS for your business and complete, unique advertising plans. RUSH YOUR NAME TODAY.

CARDMASTER COMPANY
4546 RAVENSWOOD, Dept. 162 CHICAGO 40, ILL.

U. S. SURPLUS BARGAIN

POLAROID GOGGLES

Brand new! In original packing. Each with three interchangeable lenses.

SHOCK PROOF FRAME—SHATTERPROOF LENSES

Use them for all outdoors sports, beach, motoring, boating—anything. Heavy windproof sponge rubber ventilated frame with snap button lens retainers! Adj. elastic head band. Red, green, amber flexible shatterproof lenses, all instantly interchangeable. They won't last long at this price—it's smart to buy an extra. Post paid in U.S.A.

$1.00 POST PAID

GROBAN SUPPLY CO., Dept. PS 2
1507 S. Michigan Ave., Chicago 5, Ill.

SUPER-MITE RADIO $3.99

PACKS AMAZING POWER!

SUPER-MITE FEATURES!

- World's most powerful miniature radio.
- Uses War-Born midget electronic tubes.
- Covers broadcast band, fully portable.
- Coast-wide reception obtained.
- Powered by midget hearing-aid battery.
- Picture diagram for radio beginners.

Brilliant red chassis, chrome and black dial, streamlined bakelite knobs. Complete kit ready to wire as shown Only $3.99 Post Paid. Tubes 95c each. This high quality set not available elsewhere at 10 times this price!

ELECTRONIC RESEARCH
1216 Park Row Bldg. New York City 7

BRASS Social Security Plates

STAMPED WITH YOUR NAME AND "SS" NUMBER

Beautifully satin-finished (shown 1/3 size). Please print information clearly. Priced at only **50c** each, postage paid **50¢**

ACME STAMPING SERVICE
Box 836-PS Davenport, Iowa

Now a DYNAMIC Industrial Transformer Type Super Charged WELDER

FOR AUTO, HOME APPLIANCE AND FARM REPAIRS

DESIGNED TO DO HIGH GRADE WELDING *inexpensively*—Maintenance Men, Farmers, Mechanics, Machine Shops, Foundries, Auto, General Repair and Job Welding Shops, all using the DYNAMIC find it so indispensable and useful that they can't afford to be without it. **EASY-TO-OPERATE.** If inexperienced you can easily learn to do a variety of high grade welding jobs by following the practical, *simplified Welding and Operating instructions furnished.* Once you see the DYNAMIC in operation you won't want to be without it. Its simplicity will amaze you. In a year the DYNAMIC only costs you about 7c a day. Comes complete ready to operate with helmet, rods, cable, holder, operating and welding instructions, etc.

FOR ONLY $28.50 COMPLETE

DO YOUR OWN WELDING

Just a few repair jobs will pay for this machine. A practical and profitable machine tool for any workshop. Make money doing repair work for others.

Write for Particulars

Get Details on our 10 day Trial Offer

Member Chicago Association of Commerce.

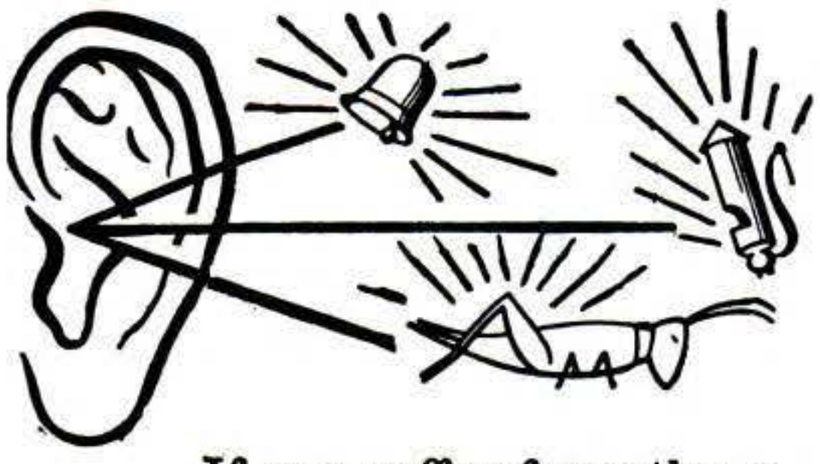
Saves You Valuable Time and Money!

This portable, **industrial** transformer type *Dynamic Welder* easily carried right to the job can be operated **from any convenient** properly wired **110 Volt 60 Cycle Line. WORKS on IRON, STEEL, BRASS, BRONZE and Other Metals.** Has 8 metallic and carbon arc heat stages. Does work you would think only possible with a larger more expensive machine ... Can also be supplied for 220 VOLT 60 CYCLE operation and other voltages and cycles at slight additional cost.

DYNAMIC WELDER CO., 15 East 23rd Street, AC, CHICAGO 16, ILL.

Copyrighted material

EAR NOISES?



If you suffer from those miserable ear noises and are Hard of Hearing due to catarrh of the head, write us NOW for proof of the good results our simple home treatment has accomplished for a great many people. NOTHING TO WEAR. Many past 70 report ear noises gone and hearing fine. ***Send NOW for proof and 30 days trial offer.***

THE ELMO CO., Dept. 1243, Davenport, Iowa

GET INTO CARTOONING!

Let **Hartman** teach you cartooning, gag writing at home. Learn by mail from a professional! Send Name, Address for **FREE DETAILS.**
Hartman Studios, 2776 California Court, Lincoln 8, Nebr.

FOR THE SHOP—HOME—FARM—INDUSTRY

Bench Type **ROTABIN**

15" High, 17" diameter with 3 steel trays, 4 compartments each circular shape. 3/4" pipe extends through center of trays, making them revolving type. Hundreds of uses. Used—good condition. Priced at fraction of original cost..... **$6.95**

NEW ALL STEEL **WORK BENCHES**

27" high, 29½" wide, 72" long. Exposed parts rounded, smooth finish. ⅛" steel top. Metal cross bars can be turned to make shelves. Stored outdoors, exposed to weather, slightly rusted. A great value for only..... **$19.95**

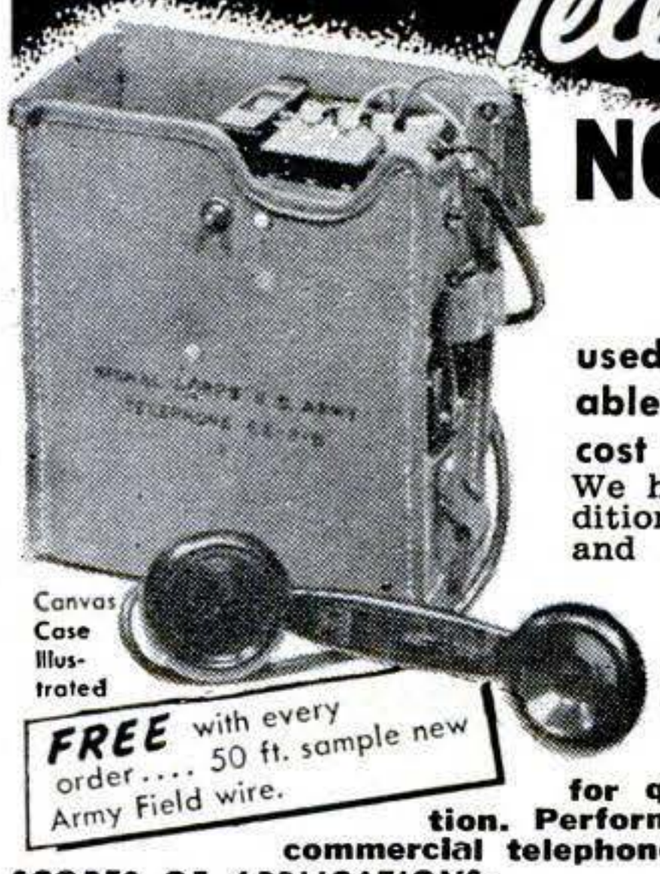
STEEL ROLLER CONVEYOR

(Used) Good condition. Sections 10' long. Ball Bearing rollers 4" center, 18" wide, 3½" Channel shaped sides. Sections can be added on. Per foot..... **$2.25**

Send check with order. All Prices FOB, Kansas City

B & G SUPPLY CO. 800 E. 18th St. Kansas City, Mo.

ARMY FIELD *Telephones*



Canvas Case Illustrated

FREE with every order.... 50 ft. sample new Army Field wire.

NOW *as low as* **$7.50**

used, but in good serviceable condition. (Originally cost govt. $39.90 each)

We have just obtained an additional large quantity of NEW and USED Army Field Telephones at low cost, and this BIG SAVING is **passed on to you in these NEW LOW PRICES! ORDER NOW!**

BATTLEFIELD PROVEN for quick, 2-way communication. Performance equals present-day commercial telephones . . . up to 17 miles!

SCORES OF APPLICATIONS:

mills	**mines**	**nurseries**	**warehouses**
ranches	**garages**	**industrial**	**construction**
camps	**schools**	**workshops**	**firing ranges**
	hunting lodges		

Anyone can install this handy, dependable telephone! Just hook up terminals to any two-strand wire; several phones on same line if desired. Operates on standard flashlight batteries with no external power required. Compact . . . rugged . . . portable. Every phone guaranteed.

Two phones comprise a set. Order as many as you need—in pairs or singly. Each phone delivered complete with hand generator and self-contained ringer.

USED—good, serviceable condition.....Per pair: Now	**$14.95**
(formerly $19.50) single phone now.....	**7.50**
NEW—with heavy canvas case.....Per pair: Now	**25.50**
(formerly $29.50) single phone now.....	**12.75**
NEW—with leather case.....Per pair: Now	**28.50**
(formerly $32.50) single phone now.....	**14.25**
NEW—canvas or leather case, with case slightly soiled, etc. Performance equals new telephones.....Per pair: Now	**21.50**
(formerly $24.50) single phone now.....	**10.75**

RECONDITIONED for Government re-issue—good as new: same prices as above.

Extra wire. Genuine 2-strand W-110 Army Field Wire. New. 500 ft. $3.50; ½-mile reel, $10.50; 1-mile reel, $16.00. (½ mile and one-mile reels sold only with purchase of telephones)

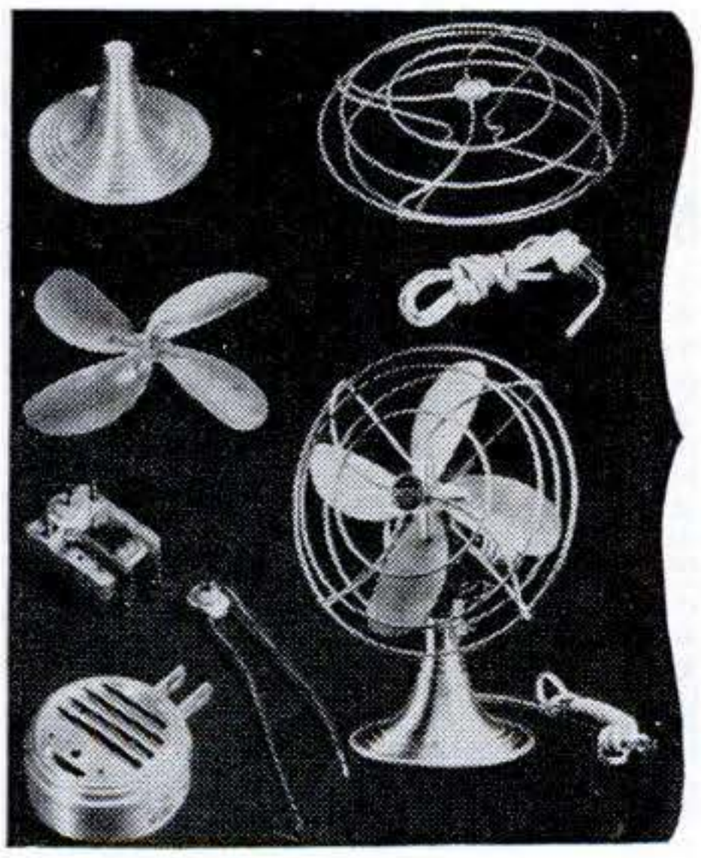
WRITE FOR FREE FOLDER ON FIELD TELEPHONES
All shipments F.O.B. Sacramento. No C.O.D.
In California, add 2½% for sales tax

SEND CHECK OR MONEY ORDER LORIS SALES

P. O. BOX 1896 DEPT. A SACRAMENTO, CALIFORNIA

MAKE HOLLYWOOD STYLE CEMENT POTTERY, birdbaths, benches, coffee tables, stucco-rock, rustic garden walks, etc. Many more. Color concrete with chemicals. Start with small capital. 10¢ brings sample, pictures, details.

HOLLYWOOD CEMENTCRAFT
8527-B Wonderland Ave. Hollywood 46, Calif.



MAKE REAL MONEY! ASSEMBLE AND SELL THESE FANS IN YOUR OWN HOME TOWN

Fun and Profit for You! Record Season Ahead for Fans

Supplies and help shortages mean fans will be in great demand again this year. Pleasant hours spent now will turn into cold cash with warm weather. Complete kit includes powerful 110V—60 cycle electric motor (completely assembled) made to meet U.L. requirements. Everything as pictured with all necessary screws, nuts, no additional parts needed. Complete instructions for assembly and testing—so easy youngster can put together in 30 minutes. Fan stands 11½" high, has 8" blade. Get order in now for early delivery. Supplies limited. Positive money back guarantee with every fan kit.

R. DONALDSON COMPANY
369 S. Maple Street • Akron 3, Ohio

COMPLETE KIT

ONLY **$3.95**
In lots of 6

In lots of 3.....$4.29
In lots of 1.....$4.95
Regularly Retails $7.95

SENT POSTAGE PAID. SEND CHECK OR MONEY ORDER. NO C.O.D.'S. Ohio Orders Add 3% for Sales Tax.

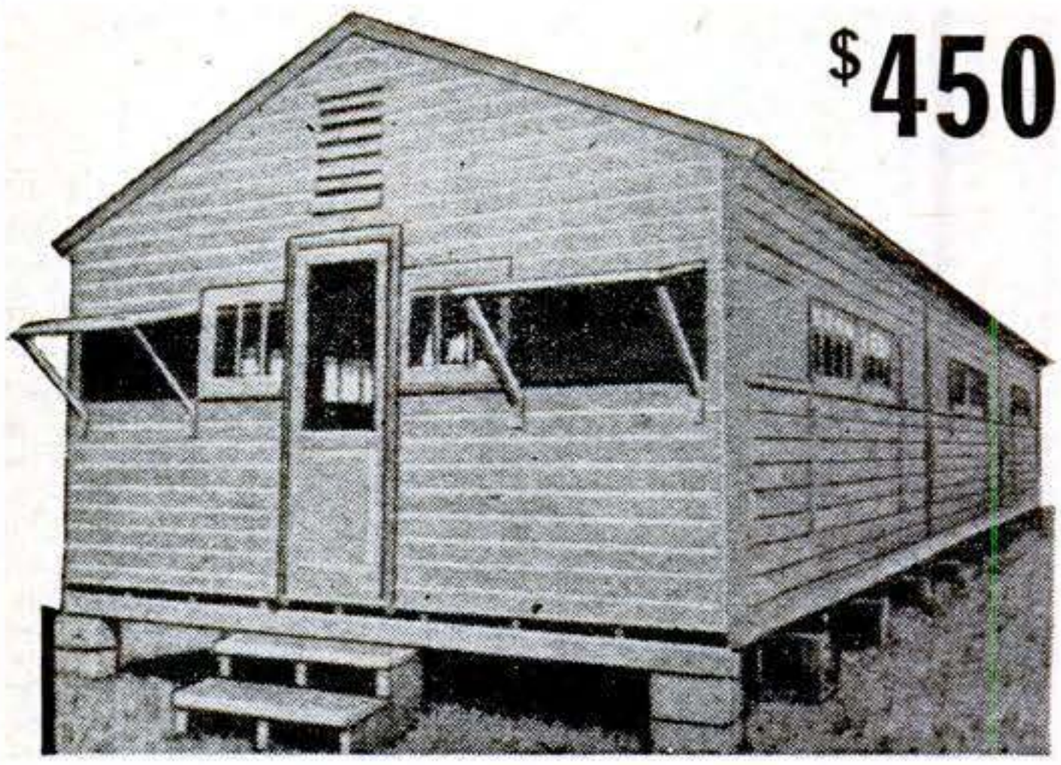
Copyrighted material

Sale! ARMY SURPLUS BUILDINGS

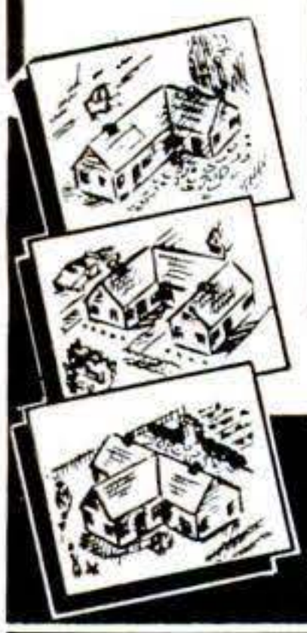
IDEAL FOR HOMES AND ALL PURPOSE BUILDINGS

FOR LESS THAN THE COST OF RAW LUMBER

$450



- SECTIONAL
- PREFABRICATED: Overall size 16' x 48'.
- GABLE ROOF: Shiplap on 2 x 4 rafters covered with 90 pound slate roofing.
- WALLS: Variety siding.
- FLOORS: 1 x 4 pine, on 2 x 4 joists, and 4 x 6 sills.
- WINDOWS: 16 glass casement type—also screens and shutters.
- DOORS: 2 screen type.
- *ALL SECTIONS are the same size and interchangeable.*



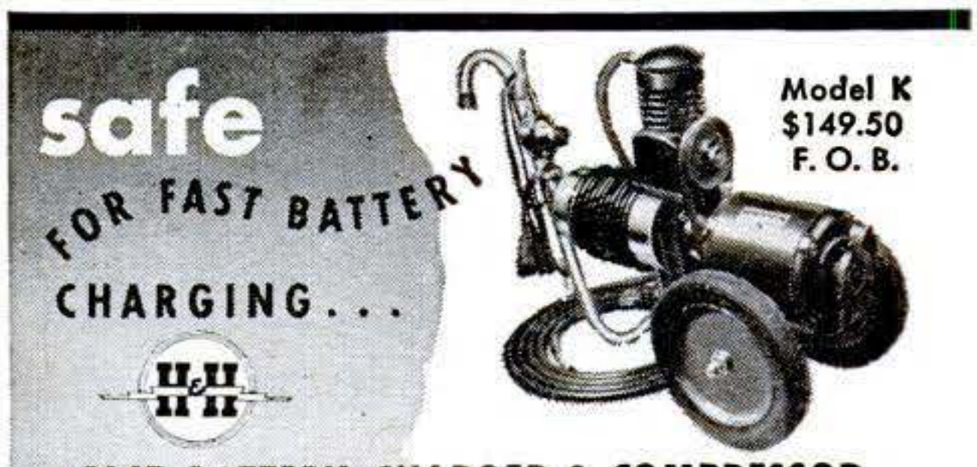
MANY USES
Homes
Summer Cottages
Tool Houses
Garages
Storage Houses
Barns
Many other uses

Sturdily built of good grade lumber in strict accordance with government specifications. Used only a few years. Easily erected with a minimum of labor and time. F.O.B. Camp Blanding (Starke, Fla.). Shipping weight: approx. 10,000 lbs. Two 16' x 48' buildings to a carload. For exact shipping costs, contact your local freight office. We arrange shipping. *Also, other sized buildings available.*

Write to:

BILLMAR HOUSES co.
Dept. PS, 516 Fifth Ave.
New York 18, N. Y.

Say You Saw
It In Popular Science



• FAST BATTERY CHARGER & COMPRESSOR

Guaranteed not to harm batteries. Users all over the world say "Wouldn't be without it!!" SIMPLE-FAST and SAFE TOO! Starts motors and inflates tires QUICKLY. Charges in 30-45 min. Model GKN gas powered for farm use. Model SN, charger only. See your dealer or write factory. VALUABLE TERR. OPEN FOR SPECIALTY SALESMEN AND DISTRIBUTORS, WRITE NOW. Mfr'd & GUARANTEED by

H&H PRODUCTS MFG. CO.
SUCCESSORS TO PLASTIFORM MFG. CO.
DEPT. PS 306 BOYD STREET • LOS ANGELES 13, CALIFORNIA

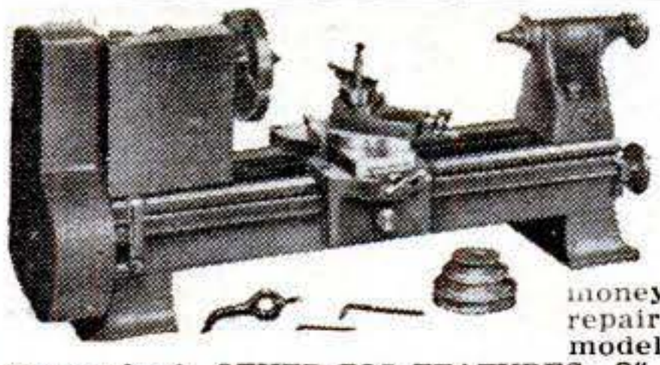
CARTOONING
Taught by 9 Professionals

Here's a new idea in cartooning schools—45 Lessons created by NINE Famous Professionals: Boltinoff, Lariar, Nofziger, Roir, Ross, Roth, Salo, Schus and Wolfe. Over 2000 Instruction Drawings! Complete course includes: COMIC STRIPS • MAGAZINE CARTOONING • SPORT CARTOONS • POLITICALS • ANIMALS • ADVERTISING COMICS • BOOK ILLUSTRATION • CUTE GIRLS, etc.

Learn the modern way! Your homework personally criticized by all 9 famous teachers. Up to 2 years to finish. *Approved as a Correspondence School under the laws of the State of New York.* For literature write to:

The PROFESSIONAL SCHOOL OF CARTOONING, Inc.
DEPT A-2 342 Madison Avenue • New York 17, N. Y.

Everyone Can Afford This LATHE!



• For Farms, Home Work Shops, Model Builders, Hobbyists

There's hardly a hobbyist, workman, farmer or tinker who can't buy this metal turning lathe! Use it to earn money; develop inventions; make repair parts; do machine work on models. Has V-Way Bed, automatic power feed; OTHER BIG FEATURES. 8" Swing; 10" between centers; 1/2" hole through spindle; 22" bed. Weighs 72 lb. Guaranteed. Price complete, except motor, f.o.b. Lansing..... **$45**

SEND FOR FREE LITERATURE!

Rosemoor Mfg. Co. 2605 Bernice Rd. Lansing, Illinois

BUILDING CONSTRUCTION

with composition cement and cheap wood builds good 3-room house for $250; barns low as $50.00. 100 illustrations and 100 money and labor saving suggestions. Get this newly revised and enlarged, guaranteed book before you build. **$1.00,** postpaid.
SHEET METAL COTTAGES and other buildings. Several new methods. Illustrated instructions, **50c.**
FURNITURE OF COMPOSITION. Cement, sawdust, asbestos, etc., scrap wood, metal, etc. Illus. **50c.**
SHOP MACHINES FROM OLD AUTO PARTS: Over 60 described, **50c.**
HOME MFG. ENTERPRISE. 50 home shop projects. Ills., **50c.**
Special: All five booklets described above, $2.00 postpaid.

HOME INDUSTRIES, 1318 So. 30th Ave., Dept. PS, Omaha 5, Nebr.

Electric Bow Tie

Lights up. Good for lots of laughs. Complete with battery in plastic pocket case, bulbs, cord. Battery and bulbs changeable.

SPECIAL $1.50 *postpaid.*

ELECTRIC BOW TIE CO.
Dept. PS, 306 Bowery, N. Y. 12, N. Y. GR 5-9453

FREE Sample!

Be the first to sell luminous house numbers, light switch plates, wall protectors, pull cords. Also luminous pictures, statues, decals, and a host of religious, nursery and other objects **that glow in the dark.** Get into this *new* and *growing* industry. Enormous demand... no competition... sensational demonstration... big profits. Represent a large manufacturer, established over 34 years. Write today for liberal money-making offer and **free sample** to show how they *glow in the dark.*

MADISON MILLS, 303 Fourth Ave.
Dept. B-5 NEW YORK 10, N. Y.

Copyrighted material

LEARN DRAFTING NOW FOR BEST OPPORTUNITIES IN ALL THE BIG OPPORTUNITY FIELDS!

Engineer Dobe

I Will Train You at Home Until You Get a GOOD PAY JOB!

Engineer Dobe

Plan now for a better job and better pay as America surges into the biggest production record in history. Drafting is the field—now bigger than ever before. And countless thousands of draftsmen and designers must come first—before any new production or construction can begin. Get into Drafting now!

You Get Experience While You Learn

I will train you at home in your spare time and give you actual experience on actual work—the same kind of jobs you will do for the best paying firms later on. You will be trained until you are competent, experienced, and are actually holding a position that will bring advancement and pay raises as deserved.

And what's more, I will give your experience as a reference to employers when you become competent. Lack of previous experience or higher education should not hold you back.

ACT NOW!

Delay gets you nothing. Mail the coupon today and get all the details and see what drafting can do for you. No obligation. No salesman will call. Give age to insure reply.

Tools and Other Equipment Sent When You Start!

Professional instruments, drawing table and other tools included and sent to you when you start. Nothing for you to buy

Be A Draftsman . . . Always First in Every Kind of Production

Draftsmen rank top because drafting is such important work. Before anything can be made or built from common gadgets to locomotives, the draftsman's work comes first. His pay is big—his working conditions are the best.

Mail Coupon for VITAL FACTS!

Engineer Dobe, Div. 22, Libertyville, Ill.
Send me the Vital Facts on Drafting and Industrial Designing, your FREE BOOK and advertised list of positions for Draftsmen and Designers wanted.

Name.....Age.....

Address.....

City.....Zone.....State.....

NEW DIRECT MAIL PLAN SAVES YOU BIG MONEY!

DE LUXE QUALITY SCOTCH PLAID *Fibre* AUTO SEAT COVERS

For Coupes and All Front Seats — Unbeatable Low Price $3.98 POST PAID

Sedans and Coaches COMPLETE SET — Front and Back Seat $6.79 POST PAID

Slips on in a Jiffy! *Fits most Cars!*

Check These QUALITY Features

- ★ Colorful, Water Repellant Scotch Plaid Fibre
- ★ Rich Leatherette inserts at points of greatest strain
- ★ Elasticized slip-over sides for snug, smooth fit
- ★ Heavily stitched seams for extra long wear

RICHLY GRAINED LEATHERETTE TRIM

We challenge comparison because nowhere . . . but ***nowhere*** will you get these ***fine seat covers*** at our ***low price!*** Yes, thanks to our amazing ***direct-from-distributor-to-you*** plan, you can now own long-wearing DeLuxe Auto Seat Covers at ***half the price*** you'd expect to pay. And don't let our low price lead you to confuse our fine covers with inferior auto slip-covers being sold elsewhere. No indeed! These are top quality, ***DeLuxe*** Seat Covers master-tailored of rugged, ***water-repellent*** scotch-plaid fibre and ***richly grained leatherette.*** Their smooth fit and handsome appearance will vastly improve the looks of your car, make it easy for you to slide in and out, protect your clothing and upholstery, and check driving discomfort.

STYLE SA 4-door sedan with 1-pc. seats and backs.

STYLE SB 2-door sedan with split back, 1-pc. seat.

STYLE SC 2-door sedan with separate seats.

STYLE CA Coupe with 1-pc. back.

STYLE CC Coupe with 2-pc. back.

HOW TO ORDER SEAT COVERS

Referring to your license card, list the ***make, year,*** and ***model*** of your car. Also give model number, body type. Also state seat style of your car as shown in illustrations at left. Put all information in coupon below and MAIL TODAY!

Ask the Man Who Owns One! Over 50,000 Satisfied Users!

SPECIAL! FOR CAR OWNERS WHO APPRECIATE THE REALLY GOOD THINGS IN LIFE!

COVERS ENTIRE BACK OF FRONT SEAT

SOLD ONLY BY MAIL Order Direct and Save

SEND NO MONEY

Pay postman price of covers ordered plus postage or send cash and we pay postage. If not completely delighted return to us within 5 days for refund under our "you must be pleased—or your money-back" guarantee!

An out-of-this-world bargain in Super-Fit, Easy-To-Install

Custom Quality Seat Covers

- ★ Superb Materials
- ★ Skilled Craftsmanship
- ★ Luxurious Beauty
- ★ Long-Life Durability

Coupes and Front Seats $6.50 POST PAID

Sedans and Coaches Complete Set $9.95 POST PAID

Compare with $16.50 Seat Covers

AMERICAN MERCHANDISING CO., Dept. FSC-65
9 Madison Ave., Montgomery 4, Ala.

Price in Canada add 50c — No C.O.D.'s

Please rush me the following Seat Covers checked below:

☐ ***DeLuxe Quality*** front seat $3.98 ☐ ***DeLuxe Quality*** complete set $6.79
☐ ***Custom Quality*** front seat 6.50 ☐ ***Custom Quality*** complete set 9.95

MAKE_____ YEAR_____ MODEL_____

Body Type_____ Seat Style ☐ Style SA ☐ Style SB ☐ Style SC ☐ Style CA ☐ Style CC

Check One ☐ I am enclosing $_____. ***Ship postpaid.***
☐ Ship C.O.D. I'll pay postman $_____ plus postage.

Name_____

Address_____

City_____ Zone_____ State_____

Copyrighted material

Embry Riddle

TRAINING COUNTS MOST IN AVIATION

Get the right kind of training for a SUCCESSFUL AVIATION CAREER at Embry-Riddle's internationally known School of Aviation—in air-minded Miami. Intensive, practical courses—CAA approved. Authorized training under G. I. Bill.

You can become a flying mechanic or a certificated A & E mechanic. Or study radio; airplane operation and maintenance; design engineering; flight. Instruction covers whole field of aviation. Immediate enrollment.

It's always Summer in colorful Miami—the aerial crossroads of the Americas!

MAIL THIS COUPON—TODAY!

Dean of Enrollments—Dept. 51-A
Embry-Riddle School of Aviation
Miami 30, Florida

Send free information on Aviation Training to:

Name.....Age.....

Address.....

City.....State.....
Check One ☐ Veteran ☐ Non-Veteran

Flash! Amazing Opportunities NOW Open in these practical money-making trades

watch and clock repairing

LEARN AT HOME—IN YOUR SPARETIME

Prepare for a happy future of prosperity, security . . . and get a big-pay job now. Fascinating, high-grade occupation. You can EARN WHILE YOU LEARN. Excellent field for part-time work at home.

COMPLETE COURSE in HOROLOGY

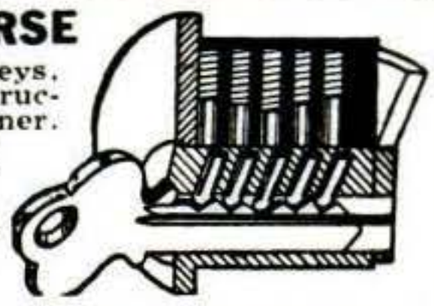
Thorough self-instruction training in American and Swiss watches, clocks. Special sections on alarm clock repairs. New, practical LEARN-BY-DOING instruction method. Learn **QUICKLY**, easily. No previous experience necessary. Watchmaking is basic training for aircraft instrument work, and other scientific precision jobs.

ONLY $4.95 COMPLETE • MONEY-BACK GUARANTEE

Get into this fast-growing field NOW . . . big opportunities . . . don't delay. Mail coupon below. Only $4.95 postpaid, or COD plus postage.

locksmithing and key making

COMPLETE UP-TO-DATE COURSE



How to pick locks, de-code, make master-keys, repair, install service, etc. New, self-instruction lessons for every handy man, home-owner, carpenter, mechanic, service station operator, fix-it shop, hardware dealer, gunsmith.

53 EASY ILLUSTRATED LESSONS

$3.95 Complete! Satisfaction guaranteed or money back. Postpaid, only $3.95—or C.O.D., plus postage.

Send No Money—Mail Coupon Today!

NELSON-HALL CO., Dept. B-01, 1139 S. Wabash Ave., Chicago 5, Ill.

On your money-back guarantee please send me the courses checked:

( ) **Watch & Clock Repairing**.....**only $4.95**
( ) **Locksmithing & Key Making**.....**only $3.95**

( ) I enclose $.....in full payment. Ship postpaid.
( ) Send C O D for $.....plus small postage fees.

NAME.....

ADDRESS.....

CITY.....STATE.....

POLISHES! SANDS! GRINDS! CURVED & FLAT

SURFACES - FASTER - EASIER! Works with any ¼" Electric Power Drill, Flexible Shaft.

You Can Use It To: Fix Bodies, Fenders; Wax, Polish Cars, Floors, Linoleum; Refinish Furniture, Wood, Metal Surfaces; Smooth, Reduce Welds; etc.

NEW FLEX Sander-Polisher

Works with your electric drill, flexible shaft or chuck equipped motor. Speeds up all grinding, sanding and polishing jobs—fits any ¼ inch chuck. Rubber face plate flexes into curves for fast, smooth, clean work. Outfit includes 6½ inch rubber disc, with metal flange and shank, fibre backed sanding disc, and heavy sheep's wool polisher. Makes your drill the equal of any $75.00 grinding or polishing outfit. Satisfaction guaranteed. Order today. Shipping wgt. 2 lbs. F.O.B. Chicago. Only **$4.95**

DEALERS WRITE

PREHLER PROVED PRODUCTS

Division Norbert Prehler & Co.
Dept. PS2, 1623-5 Milwaukee Ave. Chicago 47, Ill.

FREE LITERATURE Write Today

10" TELEVISION KIT

The Television Buy of the Times

High performance low cost television. EASILY ASSEMBLED —complete with all tubes.... .. **$184.50** *Net*

With MAHOGANY or WALNUT *Cabinet* **$210.50 net.** *Blonde Maple* slightly higher. Newly developed HIGH BRILLIANCE 10 inch Cathode-Ray tube. New Advanced TRUE FM sound. Non-flicker pictures. All parts unconditionally guaranteed 3 months. Assembled ready to play including cabinet **$262.50.** Dealers inquiries invited.

Distributors for Dynamic Television Assoc. Inc.

KENRAD TELEVISION CO., 509 S. 5th. Ave., N. Y. 17, N. Y.

DRAINS CELLARS, WASH TRAYS CIRCULATES OIL

1800 GPH 300 gal. 30' high, use ⅛ to ⅓ HP motor. Will not clog. **$6.50**

Postpaid if cash with order.
(Add 50c for west of the Mississippi.)

Thousands in use since 1936

LABAWCO PUMPS, BELLE MEAD 3, N. J.

BARGAIN OUTFIT

GRINDING WHEELS, TOOLS, ABRASIVES

345 ITEMS

12–Ass't Grinding Wheels up to 4" dia.
1–Rotary File High Speed Steel ¼" Shank
1–Rotary Cutter ⅛" Shank
12–Rotary Burs for cutting wood and soft metals
10–Assorted Cut-Off Wheels, Ass't Sizes
3–Mounted Grinding Stones ⅛" Shank
3–Mounted Stones ¼" Shank
6–Rubber disks, 1–Sharpening Stone
1–Felt, Pol. Cone, 4–Leather Pol. Bobs
5–Grinding Wheels 1" Dia. 100–Abrasive Rolls
150–Sanding discs Ass't sizes & grits
3–Mounted Grinding Stones 3/32" Shank
1–Drum Sander on 3/32" Mandrel
10–Bands for Drum Sander
6–Rubber Wheels ⅞" Diameter
10–Felt Wheels, Assorted sizes
1–Wire Brush 3/32" Shank
3–Bristle Brushes on 3/32" Shank
2–Mandrels 1 each 3/32" and 1 each ⅛" Shank

A BARGAIN ONLY $6.95 F.O.B. Chicago

$2.00 Deposit on C.O.D. orders

D. SCHUPACK RUSH YOUR ORDER TODAY!

7331 Cottage Grove Ave., Dept. SP-3, Chicago 19

Copyrighted material

Electric WONDER PEN

Burns Beautiful Designs in Wood

DECORATE Leather, Cork, etc. Works like Magic for Lining, Etching, Shading!

Learn in One FREE Easy Lesson

Amaze your friends with this exciting new craftsmanship. Enjoy this magical art for pleasure or profitable income. Make gifts or sell to gift shops. With this great electric pen you burn, etch or shade thousands of articles in gorgeous varied tones of rich sepia brown. Also apply colors, varnish finishes, etc. We supply everything in one big Special Offer.

You get the only Electric Woodburning Pen guaranteed for 800 working hours.

All materials, Tools, 9 Plaques, Book Ends, Brushes, colors, varnish, nails, sandpaper—ready for etching plus your FREE easy lesson. If your dealer does not have the genuine "Wonder Pen," order from factory. Money refunded if not satisfied.

SPECIAL OFFER only $3.00 postpaid

DEALERS: Stock this item. Write for Catalog.

Write for our Catalog of other interesting items.

AMERICAN TOY & FURNITURE CO.
6130 N. Clark, Dept. 228 Chicago 26, Ill.

EYE GLASSES BY MAIL

FREE ...of extra charge: Eye Glass Case, Wiper, Eye Glass Cleaner with Each Order!

• 30-DAY TRIAL OFFER

NEWEST STYLES. Write today for **FREE** Catalog, Full Information, Low Prices, Scientific Sight Test Chart!

SEND NO MONEY POSITIVE MONEY-BACK GUARANTEE

LOW AS $1.95 AND UP

LEE EYE GLASSES CO.
4148 Easton, Dept. Q-4, St. Louis 13, Missouri

For Outdoor Pleasure and Transportation

Ride a Royal Enfield

Famous English Lightweight Motorcycle...takes you anywhere

Royal Enfield's popular Model R. E. has *everything*—Style, Safety, Economy, Flexibility. 125 c. c. 2-stroke, single cylinder engine; 3-speed gears. *Goes 100 miles per gallon of gas!* 45 m. p. h.! Folder "S" gives you all details. Also 350 c. c. and 500 c. c. models.

Write Today *Dealer inquiries given prompt attention.*

WHITEHALL DISTRIBUTORS, Inc.
1385 Commerce Avenue, New York 61, N. Y.

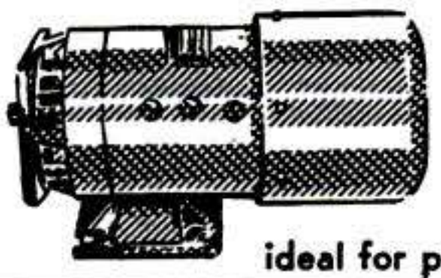
RICH OPPORTUNITIES IN JEWELRY

Shortages in the growing industry of jewelry manufacture and repair mean big opportunities for a well-paid job or a high-profit business of your own wherever you want to live. Our residential shop course approved by Veterans' Admin. is the most complete, ALL-ROUND jewelry training you can obtain. Moderate tuition, low living costs, no housing problem, congenial surroundings, your tools go with you after graduation.

COURSES IN
- Designing
- Engraving
- Casting
- Stone-setting
- Stone identification
- Plating
- Repairing

New Castle Jeweler's Training School, Inc.
260 Pearson Street, New Castle, Pa.
Send 1948 Brochure and full details.
I am a VETERAN—Yes.... No....
Name.....
Address.....
City.....State.....
.....#6028

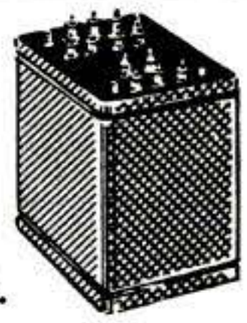
WAR SURPLUS AND OTHER BARGAINS



MOTOR-GENERATOR
Emerson Electric Mfg. Co. 3 HP Motor... AAF Type D50 FD-222-0435, 28 Volts DC, compound, 3800 RPM, 115 Amp, windings glass insulated, blower cooled, shaft dimension 5/8", Wgt. 27 Lbs. As Generator, puts out 115 Amps. ideal for portable welder.. new **$13.95** each

SEND CHECK, MONEY ORDER or CASH

Transformer Automatic Winding Co. Transformer, 5 to 42 V., 6 steps of 5 V each, 2 steps of 3-6/10 V. each, 6 Amp. maximum. Suitable for use with war surplus gadgets, house chimes, heater relays, radio test filaments, electric trains, etc. Wgt. 5 lbs.
New... **$3.50** each.



MICROMETER

Chrome plated, precision engineered and carefully tooled to give long life and highest degree of accuracy .. all new 1" capacity **$1.65** each 2" capacity **$3.50** each.

HUNTING KNIFE

Hollow ground 6" blade of bright finish, high quality, tempered steel. Non-slip cowhide handle, with hand finished metal guard and butt. Stitched and riveted genuine leather shield. It's a knife you'll be proud of! All New. **$1.50** Each.

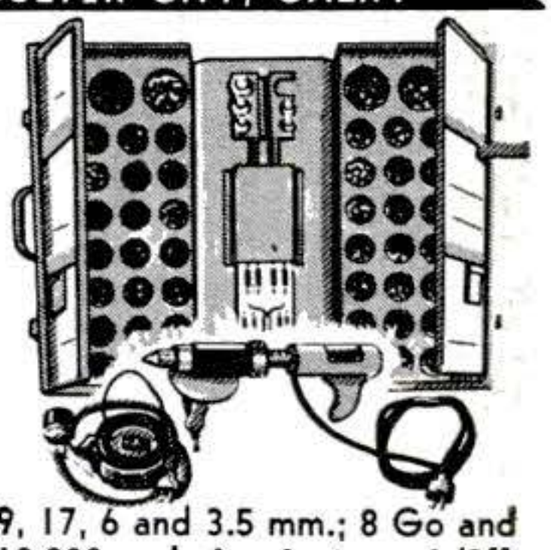
25% DEPOSIT REQUIRED ON C.O.D. ORDERS

4 in 1 SCREWDRIVER: 3 smaller screwdrivers fit compactly into hollow barrel of largest screwdriver. Sizes ..6", 3", 1½", and 1" overall. Fine steel bits. Solid brass knurled handles for non-slip grip. Large enough for standard screws, small enough for watches. Will handle all sewing machine screws. A handy all-purpose tool for kitchen, garage, or workshop. All New.. **$1.00** per set.

CLAMPS: Adel Aluminum Co., Rubber lined, assorted sizes, hundreds of uses in any shop. 5 doz all new, ass't'd sizes **$1.00**

ALL PRICES F.O.B. CULVER CITY, CALIF.

EXPLODING RIVET KIT



A real time saver . . . rivets in places where ordinary rivets can't be used. DuPont #4 Exploding Rivet Gun (110V., 750W.) with wattage regulator and six tips for 1/8", 5/32", 3/16" brazier and countersunk rivets; Starette Micrometer for measuring metal thickness from one side only; 5 drills . . . nos. 40, 29, 17, 6 and 3.5 mm.; 8 Go and No Go Gauges; approximately 10,000 explosive rivets . . . 1/8", 5/32", 3/16" in proper lengths for metal thickness of .045" to .245" by .02" graduations; long rubber covered extension cord; packed in fitted metal case. Wgt. 41½ lbs. New. **$79.00** each.

AIRBORNE SALES CO., INC. DEPT. PSM 2-8 CULVER CITY, CALIF.

Say You Saw It In Popular Science

"PLASTICS"

Work in a fascinating and profitable hobby. Just out—our latest fabricating manual. Tells you how to work with Plastics. Our new Catalogue provides all needed materials: Plexiglas—Lucite—Tenite—Catalin—Acetate—all in sheets, rods, and tubes. Complete line of cements, dyes, accessories and supplies. Send 20¢ today for Catalogue and Handbook. We apply this amount on initial order.

HOUSE OF PLASTICS
8648 Linwood Avenue, M. O. Dept., Detroit 6, Michigan

Copyrighted material

BIG MONEY IN WORLD TRADE

Get ready now for the biggest World Trade Boom in history. United States firms are eager to ship goods needed everywhere in the world. People in other lands are eager to buy. Learn how you can handle these large orders without capital—how you can run your own Export-Import business from your own home no matter where you live—near a large city or small town. Opportunities for world travel.

SALARIES TO MORE THAN $10,000 A YEAR

Yes, many Export Managers make that much. But in your own business profits are unlimited. One big order may make you more than you now earn in a whole year.

I TEACH YOU AT HOME

Send at once for free information about my short-cut, low cost course in World Trade based on my own 25 years' experience. Practical, simple. Gets you started quick! No theory. No red tape.

PREVIOUS EXPERIENCE UNNECESSARY

...nor special schooling. Many world traders have had only public school education. I give you the practical knowledge you need. I even give a list of proven representatives in foreign lands to start you right. This is the only course of its kind—your open door to a vast, uncrowded new field of opportunity for you.

WORLD TRADE CERTIFICATE AWARDED

A World Trade Certificate showing your qualifications, on successful completion. World Trade is at fever heat. Write today for FREE DETAILS. State if veteran. Air mail reaches me overnight.

B. L. Mellinger, Director • THE MELLINGER CO. • Exporters and Importers
1416-W Westwood Boulevard, Los Angeles 24, California

Amazing New Invention

NOW AVAILABLE FOR THE FIRST TIME

EVERYONE NEEDS THIS HANDY

12 IN 1 VEST POCKET "TOOL SHOP"

For Only **$1.00** (SOLD ONLY BY MAIL) POST PAID

LESS THAN 9c PER TOOL

ORDER SEVERAL ..
- ★ For the office
- ★ For your kitchen
- ★ For your car
- ★ For your pocket
- ★ For your work shop

2 for $1.75
3 for $2.50

OVER 1000 USES for this handy 12-in-1 tool that slips right into your vest pocket. Why be bothered with pockets bulging with tools? Now you can find every handy household essential you need, simply by reaching into your vest pocket. Think of it . . . TWELVE precision engineered tools, made by one of America's foremost electronic manufacturers, all combined in one smartly styled, lightweight unit. Get yours before the sell-out. Mail only $1 *today!*

Mail $1.00 with name and address to:
THE POCKET WORKSHOP, Dept. C
32 North State St. Chicago 2, Ill.

WHEN YOU WANT THE BEST, RISCO HAS IT . . .

V. M. MIXER CHANGER

PLAYS 10" and 12" Records at the same time.

MAGUIRE. 10.50
Stops after last record, permanent needle, 2-post.

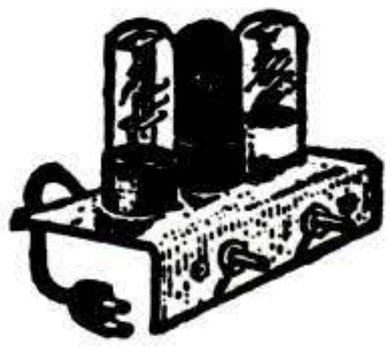
$15.50

PHONO AMPLIFIER
3 TUBE AC-DC
Wired Vol. & Tone Control **$2.75**
Uses 12SQ7, 50L6, 35Z5.
Wired & Tested—
Set of 3 Tubes **$1.95**
Output Trans. . . . . **.39**
5" Alnico Spk. **1.19**

PHONO OSC-2-TUBE
Wired & Tested 2-Tubes — $1.50. **$2.75**

SERVICEMEN'S SPECIALS

100—INSUL. RES. KIT ½, 1, 2w	**$1.65**
25—MICA COND.-CODED	**.89**
15—ASST. KNOBS	**.89**
15—ASST. BY-PASS COND. . . .	**.89**
15—ASST. SOCKETS	**.69**
10—ASST. VOL. CONTROLS . . .	**.89**
ALLIANCE PHONO MOTORS	**2.50**
ASTATIC or SHURE PICKUPS . .	**1.79**



25% on COD orders—FREE CATALOG S2—ORDER FROM THIS AD

Wholesale Distributors—RISCO ELECTRONICS, 22 Warren St., N. Y. 7, N. Y.

---

17 JEWEL—2 PUSH BUTTON

CHRONOGRAPH $29.75 PLUS 10% TAX

"4-in-1" ALL PURPOSE TIMEPIECE
- **WRIST WATCH • STOP WATCH**
- **TELEMETER • TACHOMETER**

Incabloc Shock Resistant Feature, Anti-Magnetic, Sweep-Second Hand, Radium Dial, Unbreakable Crystal, Stainless Steel Back. (Formerly $71.50.) Each watch BRAND NEW, NOT SURPLUS! Ideal for: PHYSICIANS, SPORTSMEN, PHOTOGRAPHERS, RADIO BROADCASTERS, ENGINEERS, AVIATORS, etc.

OUR GUARANTEE:
MONEY BACK in 10 DAYS
—if not satisfied for any reason!
ALSO AVAILABLE in 18 K. GOLD CASE **$64.50** (plus 10% Tax) Formerly $125.00.
Mail-orders promptly filled. Shipped C.O.D., or send check or money-order.

Men of action wear Chronographs

ADLEW JEWELERS (Dept. PS-2)
117 W. 42nd St., NYC 18

TELEVISION—$1.75

Save **$200 OR MORE**

You can assemble your own large image 12" or 15" television receiver on the kitchen table in 20 hours at minimum cost. Tens of thousands have done it without instruments or previous knowledge of television or radio. Famous **TRANSVISION INSTRUCTION MANUAL** makes it possible. Includes chassis layout, wiring diagrams, photos, parts list, prices, step-by-step instructions—all the information you need. $1.75, postpaid or C.O.D.
RadionicEquipmentCo., 170E. NassauSt., N.Y.7, N.Y.

GOVERNMENT SURPLUS PS1 100 BRAND NEW

VICKERS HYDRAULIC PUMPS

Hundreds of Practical Uses

BUILD YOUR OWN HYDRAULIC PRESS, ELECTRIC EYE DOOR OPENER, ETC.

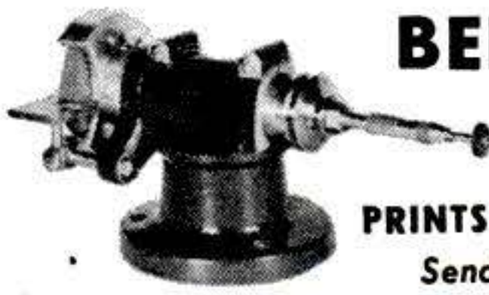
$15.00 F.O.B. DETROIT, MICH.

JAY-CEE SALES CO.
4555 Gd. River Ave. Detroit, Michigan

Say You Saw It In Popular Science

BUILD YOUR OWN **HIGH-SPEED**

BENCH GRINDER



From Our
Prints, Castings & Parts

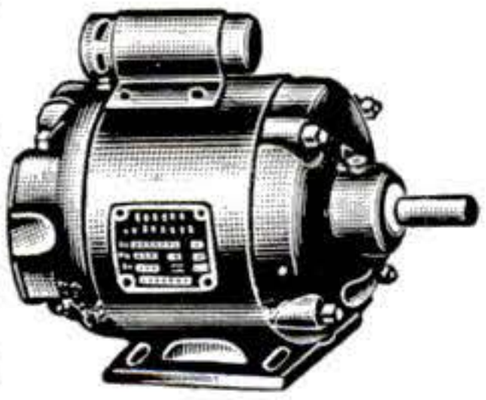
PRINTS AND CASTINGS ONLY $10.00
Send for Free Illustrated Circular
WORKSHOP TOOLS, Box 518, Merrick, N. Y.

Copyrighted material

ELECTRIC MOTORS

HEAVY DUTY—Nationally known makes.

Guaranteed capacitor type ball bearing heavy duty motors, 110/220 volts 60 CYCLE AC SINGLE PHASE 1725 RPM.



1/4 HP.....$24.00
Wt. 30 lbs.

1/2 HP.....$34.50
Wt. 36 lbs.

3/4 HP.....$44.00
Wt. 50 lbs.

1 HP.....$57.00
Wt. 80 lbs.

These motors also furnished in 3450 R.P.M. at above prices. Prices are F.O.B. Chicago. Immediate delivery. Send check or money order today.

SOLD ON MONEY BACK GUARANTEE

C & M EQUIPMENT COMPANY

1831 S. STATE ST., DEPT. B-2 CHICAGO 16, ILL.

Boat Pattern Catalog — 55 famous Plywood Designs with full size cut to shape patterns, — blue prints — Kayacks to Cruisers — by the outstanding specialists MacGregor & Deed — plus Wm. Deed's booklet "Plywood Boats." Send $1.00.

Also Available **PACKAGED BOATS**

Save 50% — Build from our precision cut moulded and sheet plywood Kits — Finest design — Full hardware — Nothing else to buy — Illustrated instructions — $34.50 up — Send 25c (coin) for photos and literature

MARINE MART — BUFFALO 7A, N. Y.

LEARN RADIO $4.95 post-paid

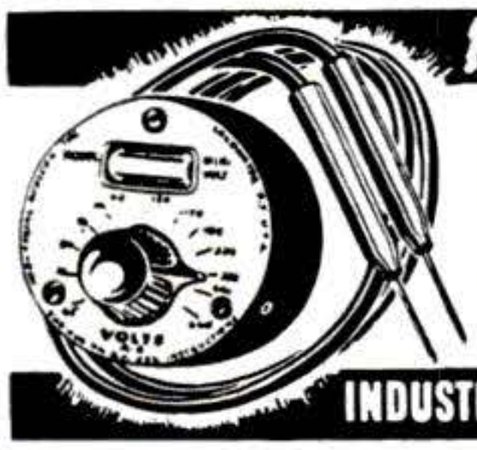
by ELECTRO-KIT

Get started in the electronic field now. Complete kit contains ALL parts necessary to build complete radio set. Includes instruction book, electron tubes and batteries. NO SOLDERING NECESSARY—USES NO ELECTRICITY—NOTHING ELSE TO BUY. Only $4.95 postpaid, or send $1.00 with order, balance C.O.D.

SCIENTIFICS, Inc.

236 East 43 St. N. Y. 17, N. Y. Dept. S-2

FLASH THAT VOLTAGE



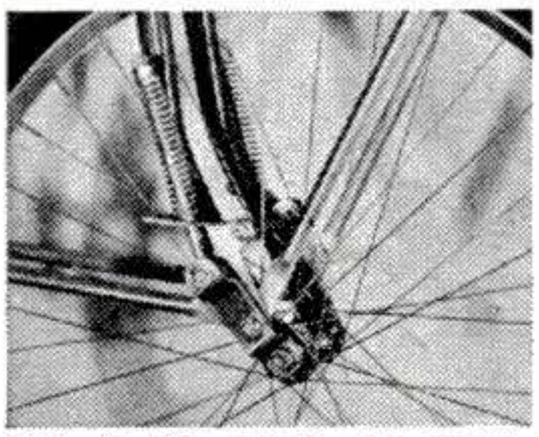
Turn that knob. Extinguish the neon glow. Instantly read voltage right off dial. MINI-VOLT measures 65 to 660 v. AC. Also DC. Tells whether AC or DC. Virtually burnout-proof. Guaranteed for 10,000 hours' operation. Bakelite case. 12" flexible test leads and test prods. A "must" in electrical and radio work. Model 400B only $2.50 postpaid!

INDUSTRIAL DEVICES, INC., EDGEWATER, N.J.

Say You Saw It In Popular Science

DO YOU RIDE A BIKE?

Shock Absorber for all Bicycles



- **Levels Rough Roads**
- **Prevents Broken Spokes, Wheels, Forks**
- **Makes Riding Smoother, Safer**
- **Easy to Install**

"Shock Absorber"—the front wheel shock Absorber—is ruggedly constructed of nickel plated steel and engineered for years of real service. It'll pay for itself in added pleasure, saves tires and eliminates many costly repair bills. 20,000 satisfied users. Order yours today. Only $3.69 postpaid. No C.O.D.'s. Complete satisfaction or money back. Dealers Wanted.

H. M. GIBB and COMPANY 1304 Penobscot Bldg. Detroit 26, Mich.

SURPLUS BARGAINS

The Mart brings you the opportunity of a lifetime to share in the greatest money-saving values ever offered. A great array of war surplus items—practically all brand new—some slightly used but guaranteed perfect—at a fraction of their Gov't. acquisition cost; contract termination items at give-away prices. Thousands of articles you've been waiting for, built to stiff Government regulations. Watch for all The Mart ads. The Mart will bring you amazing values.

LINK SEXTANT

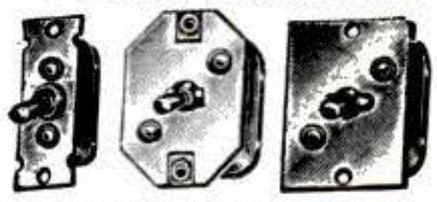
Bubble Type

Built for the U.S. Army Air Corps by Link Aviation Devices, Inc. Includes two spare white discs. Complete directions for using. Sextants, while slightly used, are in "like new" condition and in top working order. Strong O.D. wood case has separate compartments for working parts, lined with felt. Weighs 6 lbs. 14 oz. Original cost $230.00. A truly remarkable bargain at only..... **$17.50**

PISTOL GRIP SWITCH

Gives you trigger action for "ons" and "offs". Complete with rubber covered lead wire and plug. Made of enduring plastic. Adjustable tape for hand fastening. New. Use on any circuit up to 115 volts. Made by Cutler-Hammer. Hundreds of uses. Weighs 12 ounces. A real buy at only..... **$1.19**

TOGGLE SWITCHES



Seven assorted toggle switches, all panel mounting types. All different. SP-ST, DP-DT, DP-ST. Brand new. Just the thing for your home made equipment, models, inventions, radio, electronic and other electrical equipment. Complete assortment. Weighs 11 oz. A bargain at only..... **$1.69**

INDUSTRIAL GOGGLES

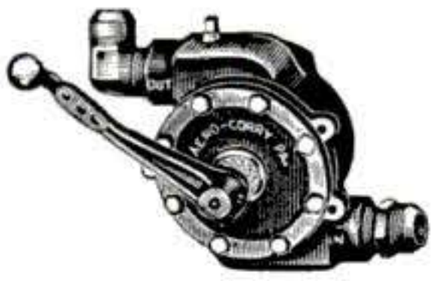
You get real eye protection with these Industrial Protective Goggles made by Wilson, Kimball, American Optical. Frame is ventilated for added wearer comfort. Lenses are clear for easy visability and are truly shatterproof. Weighs 4 oz. Assures eye safety while grinding, buffing, etc. Real eye protection at only..... **$1.29**

METAL BOX

Fireproof. For safekeeping your valuables, private papers, petty cash, stamps, etc., or in your shop for small parts, expensive tools, etc. New. All metal, most attractive brown, enduring finish; lock and key. 13⅜" x 6" x 4⅛" deep. Ideal for home, office, shop. Weighs 1 lb. 9 oz. A splendid value at. **$1.19**

WOBBLE HAND PUMP

For Most Liquids



Originally designed for use as a liquid fuel hand pump. Brand new. Has standard one inch pipe thread intake and outlet. Type D-4. Made by Aero-Corry. With a 3' lift and 6' head at 60 strokes per minute, pumps 42.5 gallons per hour. Just rock the handle back and forth to quickly drain tanks, ponds, basements, any place where liquids gather or are stored. Not to be used for salt water or acids. Weighs 6 lbs. 11 oz. A most useful buy at only... **$19.95**

ORDER THIS EASY WAY

Print your name, address, list of items. Enclose check, money order, bank draft. Add sufficient postage if shipment is parcel post. Excess postage immediately returned. On C.O.D.'s, include 25% deposit. Items are guaranteed as described. If not completely satisfied, after ten days, return goods and your money quickly refunded. Order your needs today.

FRACTIONAL H.P. MOTOR

Ideal for use on all types of mechanical displays wherever small power is required. Made by Oster. Shaft terminal has helical cut gear; readily and easily replaced by a pulley. New. Operates on door bell or chime transformer, AC-DC 12 or 24 V. Approximately 1/25th H.P. Use one to make your own hand grinder, other power tools. Weighs 13 oz. A value at only..... **$2.98**

THE MART

DEPT. S-28
11 East Harrison Street
Chicago 5, Illinois

FIELD JACKETS

A Super-value, fine poplin Army FIELD JACKET can be yours for only $2.88. Quality features; full zipper-front, 100% blanket-lined, water repellent, adjustable hip straps. Ideal for Farmers, Lumbermen, Truck Drivers, Sportsmen. Although used, every jacket guaranteed perfect condition. Sizes 34 to 40. State size and send check or M.O. Supply limited. Hurry.

(War Surplus) ONLY **$2.88** Postpaid

MARKO SURPLUS CO., Dept. PS 2924 Logan Blvd., Chicago 47, Ill.

Copyrighted material

NEW ONE-TUBE PORTABLE RADIO-PHONE

Just Pick Up Receiver—Dial a Station And Listen!

IT'S LIKE THE MAGIC OF TOMORROW! A real one-tube RADIO SET built in a standard size "telephone." All you do is attach ground wire to any metal—and you're "all set"! Pretuned. Pick up stations in 100-mile radius on all wave lengths. Just dial the station you want! A thrill for young and old.

Also available in crystal-type set. Only $5.98. Uses no electricity, no batteries. No tubes to burn out! Attaches to radiator or water pipe, etc. Picks up stations in 10 mile radius, any wave length. Special antenna only $.98 additional.

ONLY $8.45 complete with batteries

Either crystal or 1 tube set will be sent postpaid if you enclose check or money order, or, if you send $1 deposit we will ship C.O.D. *Money back if not delighted! Order NOW from*

EXTRA! For Flash Gun Fans!
A complete Kit for building an electronic flash gun good for 50,000 shots. Only $89.50. Write for FREE Details.

ELECTRONIC PRODUCTS, Dept. PS, 141 Broadway, New York 13, N. Y.

New! BLACK & DECKER

HOME-UTILITY ¼ inch ELECTRIC DRILL

This portable electric drill handles hundreds of "odd jobs" in homes, hobby shops, farms, repair kits. Only 7⅝" long, weighs 3¼ lbs. Will drill to ¼" in steel. Has fast-operating Jacobs hex-key chuck and an instant-release trigger switch. Operates from any 110 volt A.C. or D.C. circuit at 2250 RPMs'. Order today for immediate delivery. **$18.95**

Postpaid upon receipt of check or M.O.; C.O.D. you pay postage.

For General "all-purpose" drilling from ⅛" to ½" order the Black & Decker Home-Utility ½ inch Electric Drill $35.95

ASTORIA REFRIGERATOR EXCHANGE
25-57 STEINWAY ST. Dept. S-2 LONG ISLAND CITY 3, N. Y.

$200.00 NAVIGATOR'S SEXTANT $17.50

GOV'T. SURPLUS

A precision instrument of recognized quality. These Link Sextants are used for navigating by the stars or other celestial bodies, on large and small boats—for all types of aircraft—anywhere on the face of the earth. The Sextant is to the mariner what the transit is to the surveyor.

FINEST PRECISION CONSTRUCTION

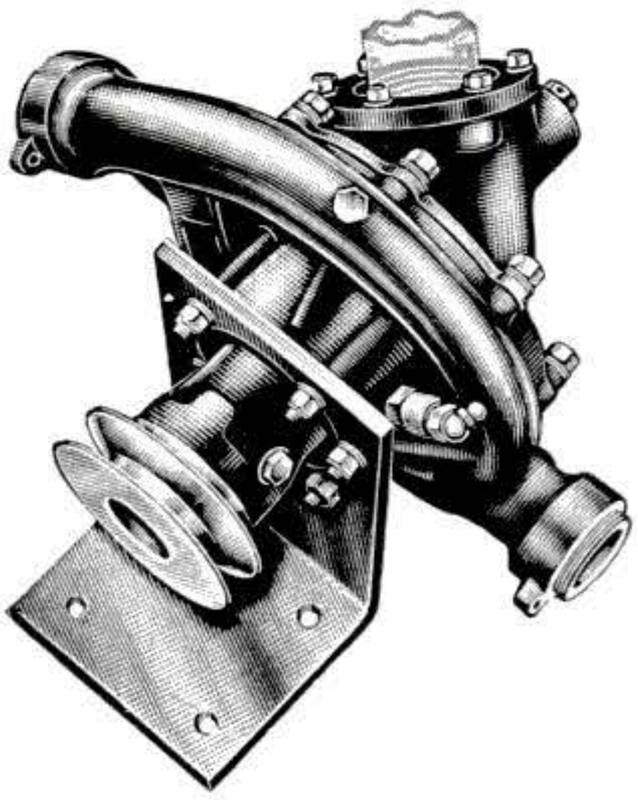
The fine Link Sextants are the products of a famous name manufacturer. Original procurement cost was approximately $200.00. Now, as war surplus, you can buy one at a fraction of original cost. Instrument is equipped with easy-reading vernier type scale. Bubbles are checked for accuracy. Although slightly used, they are in perfect operating condition. Furnished complete with operating instructions and protective wood carrying case 8x12x4 inches. These are guaranteed to be the genuine Link A12 Sextants. Sold FOB Houston. Send check or money order. Rush your order.

$17.50

AERO PARTS SUPPLY, Dept. PS2
Municipal Airport HOUSTON 17, TEXAS

WAR SURPLUS BARGAIN SPECIAL

BELT DRIVEN CENTRIFUGAL PUMP



READY TO USE ON ANY LIQUID PUMPING NEED

NOW ONLY $29.75

FOR HOME WATER SYSTEMS, IRRIGATION, FIRE PROTECTION, DRAIN BASEMENTS, PONDS, ETC.

● A super value for all types of intermittent service in pumping large volumes of liquid for stock watering, home and shop water systems, irrigation, draining pools, basements, etc. At 1750 RPM on 23 foot head will pump 42 gallons per minute; at 3600 RPM on 52 foot head will move 88 gallons per minute. Cast aluminum housing. Accurately machined bronze impeller vanes. Complete with mounting bracket and 3½ inch V belt pulley. Run with electric motor, gasoline engine, power take-off on tractor, etc. Shaft rotates on sealed ball bearings with grease gun fitting. Has 1½ inch threaded intake flange, two 1 inch outlets. Use one or both as necessary. Made for Packard Motor Car Co. for use in Rolls-Royce Merlin Aircraft engines. Comes complete with pulley and mounting bracket. Original cost approx. $147.00. Sold F.O.B. Chicago. Shipping weight 23 pounds. Complete engineering reports and operating instructions free with pump. You can't beat this pump value at anywhere near this price. Satisfaction guaranteed.

ORIGINAL COST APPROX. $147.00
IMMEDIATE DELIVERY FOB CHICAGO
SPECIAL PRICE, WHILE THEY LAST **$29.75**

GROBAN SUPPLY CO. 1507 So. MICHIGAN AVENUE Dept. PS-2, Chicago 5, Ill.

BEARINGS Fafnir, S.K.F., N.D. & Torrington

Bore	O.D.	Type
.250	.750	Ball
.1575	.6299	Ball
.1895	.500	Needle
.1895	.625	Needle
.2495	.625	Needle

Priced at 15 cents each.
Minimum order 10 bearings.

JAY-CEE SALES CO.
4555 Grand River Ave. Detroit 8, Mich.

PRESTO! ANYONE CAN MASTER GLAZE

Car Owners! Meet Master Glaze—the sensationally different luster for new and used cars! Not a wax—not an oil polish—not a paint!—nothing that "smears" over the surface.

MASTER GLAZE is a unique discovery—a creamy liquid—quick and easy to apply! Gives a hard, glass-like surface. Even gasoline cannot dull it! Lasts six months to a year! Amazing luster—beautiful, sparkling clean and brilliant! Doesn't finger-mark—doesn't smear! A match box full glazes an entire car. Seals the pores—protects! NOTHING LIKE IT!

AGENTS
An unusual opportunity! Quick, flashy demonstrator. Big profits. Good territory. Write today!

FREE SAMPLE
Just send your name and address to
MASTER GLAZE CO., 7720-635 W. Harwood Ave., Milwaukee, Wis.

Copyrighted material

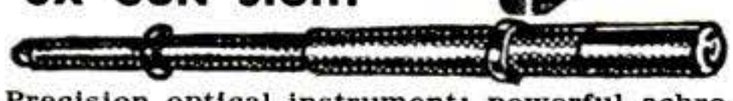
MAIL ORDER GADGET CORNER

MICROSCOPE

Fascinating worlds revealed beyond the naked eye. Precision achromatic lenses provide sharp, true definition; standard optical threads. Magnification: 65-75X. Weight, 7 lbs.; base 6¼ in. by 4¾ in.; height overall 10½ in. Sturdily built for long wear. Just what students and gadgeteers are looking for!

$29.95

3X GUN SIGHT



Precision optical instrument; powerful achromatic color corrected lens; waterproof, dustproof, shockproof. All bronze and brass body; a find for bird and nature study. Govt. cost approx. $175.00.
Each..... **$4.95**

TANK PERISCOPE

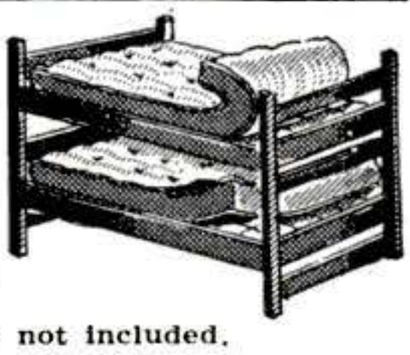
$7.95 Periscope contains compact, high quality telescope with two power lens system to give color-free field of vision. Achromatic objective has 15/32 in. diameter; 3⅛ in. focal length. Hunters can convert into telescopic rifle lens; lab men into microscope. Periscope used by boy scouts and nature students to look around corners without being seen. Meets rigid tank corps standards.

ELBOW TELESCOPE

3-power, field view 13 degrees, 20 minutes. Achromatic, color-corrected. Can be converted by shopmen to a "center-scope" for drill press, jig and tool work. Lens suitable for photography and microscopes. Gov't cost approx. $150. ..... **$6.95**

BUNK BEDS

$8.95



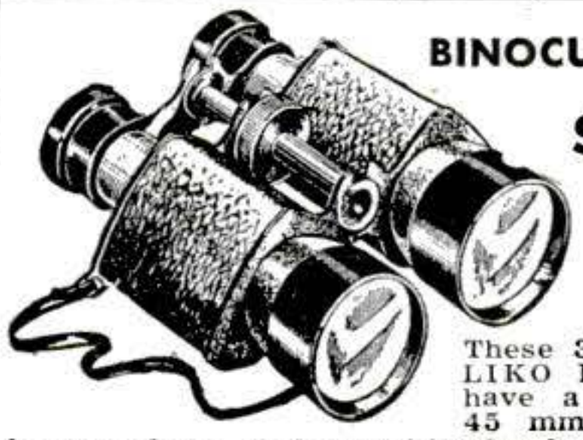
Sturdy hardwood. O.D. color. In excellent condition. to be used as a double-deck bunk or twin bed combination. Mattress not included. FOB. Milwaukee.

SURPLUS BARGAINS!

Trench Shovel	98c
2 pc. Mess Kit	69c
Wool Sleeping Bag	$2.95
Jungle Hammock	$5.95
Air Corps Type Sun Glasses	$2.98
36 inch Air Corps Target Balloons	98c

BINOCULARS

$9.95



These 3½ power LIKO Binoculars have a powerful 45 mm. optically ground and polished objective lens. Smartly built for the theater, movies, sporting events, and hikes. Coated lens increases visibility; reduces glare. Adjusts perfectly to every eye. Nothing like it anywhere near the price!

STRAIGHTEDGE

Bright steel, square edge 24" long, 1½" wide. Graduated in yards 1 to 20,000. Originally manufactured for the Engineer Corps at gov't cost of $3.37 each.
Shpg. wgt. 1 lb..... **98c**

6-POWER BATTERY C. O. TELESCOPE

All-prism type instrument, 6 lenses perfectly ground. Clear, flat, color-corrected field of vision. Adaptable as right-angle view finder for cameras. Gov't cost over $300..... **$11.95**

SURPLUS DISTRIBUTORS

924-B N. Plankinton Ave.
Milwaukee 3, Wisconsin

All orders shipped F.O.B. Milwaukee, postage collect. Send money order or check. On C.O.D. orders, enclose 20% deposit, balance plus postage on arrival. No orders accepted from Canada or any other country using British monetary system.

THIS MOTOR

1/30 HP 24 volt DC motor 2450 R.P.M. .95 amps ¼" shaft size overall 3" x 4". Weight 3 lbs. Also operates on 32 volts ..... only **$2.45**

USE AS 6 VOLT GENERATOR—Generate your own power. Can be operated on your bicycle wheel. Furnishes sufficient power for two 6 volt bulbs. Resistor furnished free with each motor enables you to maintain constant voltage. Special Price **$2.45**, or **4** for **$7.50**. Write for price in larger quantities.

INGERSOLL-RAND

Riveter & Chipping Hammer

Model AVC-11, like new. Takes up to 5/32" rivet. $66.00 list. Special price **$6.95**. Wt. 5 lbs.

Prices are F.O.B. Chicago. Immediate delivery. Send check or money order today. Sold on money back guarantee.

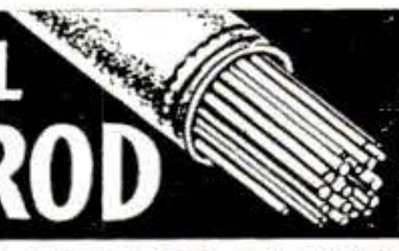
C & M EQUIPMENT CO. 1831 S. State St., Dept. B-2 Chicago 16, Ill.

$1.00 POSTPAID SPECIAL OFFER!

Famous, patented, lock-stitch sewing awl complete with needles, waxed thread, direction folder. Hundred uses—sewing, repairing leather goods, canvas, belting, old or new harness, saddles, gun cases. Satisfaction guaranteed, or money back. Send currency, check, or money order, no stamps, please.

Yates Mfg. Co., 611-K Main Street, Lake Geneva, Wis.

TOOL STEEL DRILL ROD



$1.95 POSTPAID in Continental U.S. C.O.D.'S ACCEPTED

25 Rods — SAMPLE KIT — 25 Sizes

Ground and Polished to a Perfect Finish

1001 uses for CRAFTSMEN, HOBBYISTS, MECHANICS, Etc.

For Making Punches, Chisels Engraving Tools Shafts, Etc.

Free machining, easily worked, yet can be made file hard or hardened to spring temper. Hardening instructions included!

FREE With Every Kit or first order 6" Steel comb, rule & depth gage with pocket clip and latest price list.

FLAT TOOL STEEL

The Precision ground flat tool steel with the satin-smooth finish. Simple to work, easy to harden, ready to use.

SHOP ASSORTMENT **$4.80**
(5 dif. Pieces—1/32" to ⅛" thick; ½" wide; 18" long.)

BOTH KITS $6.50

Complete **aluminum—brass—stainless & tool steel** stocks
Include 25c postage on orders under $5.00.

BESSEMER STEEL COMPANY OF AMERICA, DEPT. CC-14
1958 W. 59th St. Chicago 36, Illinois

MAKE UP TO $5.00 AN HOUR In Your Own YEAR 'ROUND Business!

ONLY A FEW DOLLARS PUTS YOU IN BUSINESS!

Many Clearing as High as $20 to $30 a Day *NET* Renewing Rugs, Carpets, Upholstery. New Method Now Used for Auto Upholstery. Write for Facts About Quick, Easy Way to Get Started

Here is the chance you've been looking for to step into a pleasant, dignified, big-pay business of your own that offers you a steady, year 'round income. Start on "a shoestring," full or spare time, right from your own home. Equal opportunities for men and women, young or old, in small towns or big cities. **No experience needed.** Many making big money with new Americlean System just cleaning auto upholstery. **Easy to learn.** We send you complete instructions and quick-cleaning supplies so you can start making money the very first day! Quick method cleans upholstery, rugs and carpets like new without taking off floor! Tremendous demand in homes, apartments, hotels, stores, office and public buildings. **Steady repeat** business. Territories going fast. Write today for full FREE facts. No cost or obligation. Rush letter or postcard now to

AMERICLEAN CO., Inc.
Dept. H-14, 211 North 7 St., St. Louis 1, Mo.

WRITE FOR FREE DETAILS NOW!

Copyrighted material

9 BIG NEW BOOK

EVERY ONE AN UNBEATABLE VALUE!

Prepared by the Editors of POPULAR SCIENCE MONTHLY, these great books are bursting with up-to-the-minute information, pictures and diagrams that will save you both time and money! You need not hesitate to order one or all for your own enjoyment or to use as gifts.

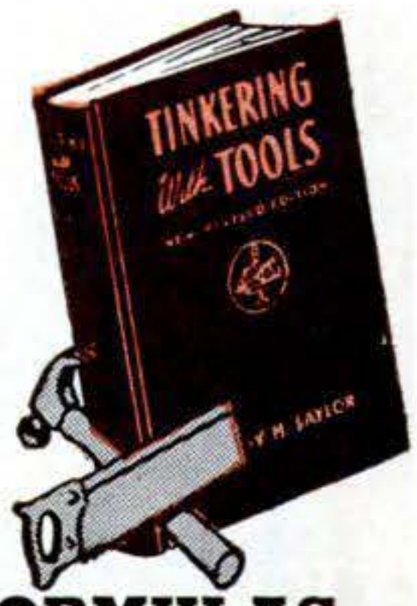
We guarantee complete satisfaction or your money back!

$3.48

NEW HOME WORKSHOP ENCYCLOPEDIA

Here's a giant book that's jam-packed with over 840 thrilling things to make and do in your own home workshop! It's filled with over 1500 pictures and diagrams that show you how to build bookcases, furniture, cabinets, toys, games, gifts . . . how to repair radios, autos, electrical appliances . . . and no end of ideas for keeping the home shipshape! Yes, you'll even find dozens of chemical experiments, hints for the garden, photographic ideas and woodcarving projects. 580 pages! Handsome DeLuxe edition! Printed in 5 colors!

TINKERING WITH TOOLS



$1.49

It's *easy* to do your own repairing—and lots of fun—if you follow the simple instructions in this big 260-page book! Everything you need to know about carpentry, plastering, plumbing, painting, masonry, shingling, wallpapering, electric wiring, etc. 215 pictures. DeLuxe edition.

THE HOME CHEMIST

Shows you how to set up an inexpensive lab and perform hundreds of thrilling experiments. How to do amazing chemical tricks, and magic. 192 pages. DeLuxe edition.

$1.49

BOOK OF FORMULAS

A wealth of formulas, recipes, and secret processes for making soap, ink, insect spray, glue, furniture polish, hundreds of other useful household items! 250 pages. DeLuxe.

$1.49

WONDERS through the MICROSCOPE

Hundreds of exciting experiments you can do with *any* microscope! How to secure specimens, build apparatus, make slides and photo-micrographs, etc. 192 pages! DeLuxe.

$1.49

DECORATIVE METAL

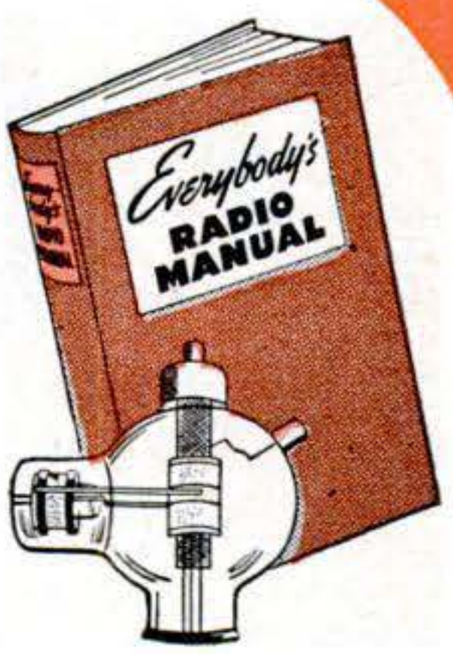
How to make useful, attractive articles out of sheet metal, pewter, bronze, steel and precious metals. Directions for bending, shaping, finishing, antiquing, etc. De Luxe.

$2.00

Copyrighted material

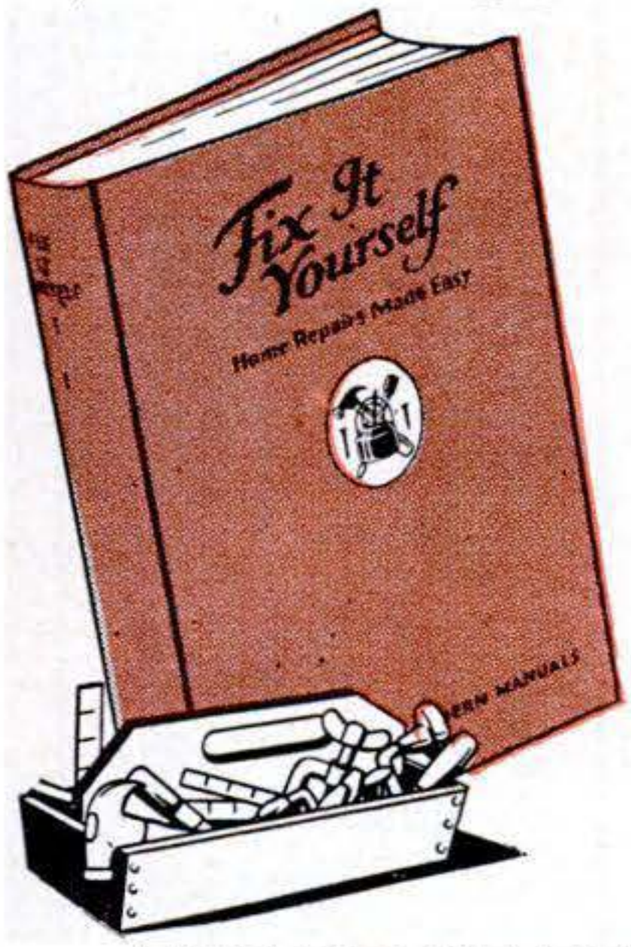
BARGAINS FOR YOU!

EVERYBODY'S RADIO MANUAL



$1.49

How to build and repair your own radios — tiny portables, F-M receivers, radio-phonographs, short-wave sets, recorders; wireless record players, etc! Written in simple, non-technical language with a wealth of drawings, diagrams and wiring circuits that make every step easy to follow! 256 pages. 216 pictures. DeLuxe edition.

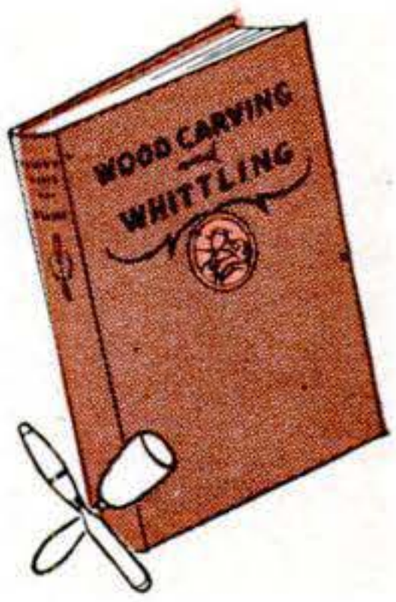


FIX IT YOURSELF

$1.49

Home repairs made easy. Be your own handy-man! Simple directions and easy-to-understand diagrams show how to fix and repair furniture, electric outlets, windows, doors, leaky pipes, floor boards, chimneys, boilers, weather proofing, apply wallpaper, lay linoleum, and hundreds of other construction and repair jobs around the house. You will be surprised how easily you can do things after reading "Fix It Yourself." 256 pages, 163 helpful illustrations, complete index, DeLuxe edition.

WOODCARVING AND WHITTLING



$2.00

Here's a fascinating hobby anyone can learn with this *completely illustrated,* easy-to-follow book! You'll find step-by-step instructions for making scores of ornaments, jewelry cases, furniture of all kinds, treasure chests, trays, chairs . . . and even wooden figures of men and animals! Over 270 pages, with 150 pictures to explain your every move! A gold mine of ideas packed in one big book!

SEE THESE BOOKS AT OUR EXPENSE!

Send no money now—mail this Order Form! When postman delivers books pay listed prices plus few cents postage. Read them 7 days free—if not delighted return for full refund!

POPULAR SCIENCE, Dept. 127S
353 Fourth Avenue, New York 10, N. Y.

Please send me the book(s) checked below. I will pay postman the price shown, plus few cents postage, on delivery. You guarantee complete satisfaction or I may return books in 7 days for a full refund.

- ☐ NEW HOME WORKSHOP . $3.48
- ☐ TINKERING $1.49
- ☐ WOODCARVING $2.00
- ☐ BOOK OF FORMULAS . . $1.49
- ☐ RADIO MANUAL - - - - - $1.49
- ☐ FIX IT YOURSELF - - - - $1.49
- ☐ HOME CHEMIST - - - - - $1.49
- ☐ DECORATIVE METAL - - - $2.00
- ☐ WONDERS through the MICROSCOPE . . . $1.49

NAME.....

ADDRESS.....

CITY.....ZONE.....STATE.....

☐ *Check here if you remit now, and we will pay postage. Same refund guarantee.*

Copyrighted material

WAR SURPLUS AND HUNDREDS OF OTHER BARGAINS

HAND MICROPHONE

Top quality hand microphone with control button in handle. Highly sensitive. Has rubber covered cord and tel. plug. Fine for use on home recorders, public address systems, etc. Brand new—perfect. Shp. wgt. 2 lbs. **Stock No. 170.** Each . . **$1.95**

MESS KITS

Regulation two-piece Army Mess Kits with folding handle. Used, but perfect. Weight 2 lbs. **No. A116**—Ea. . **69c**

CANTEENS

Reg. U. S. issue canteens. Plastic screw top chained to body. Slightly used but perfect. Wgt. 1 lb.
117—Metal
118—Plastic—Ea. **69c**

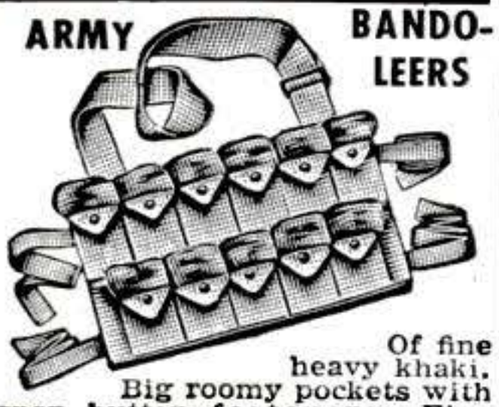
CANTEEN CUPS

All metal. Folding handle. Wgt. 1 lb. **No. A120**—Each.....**25c**

CANTEEN COVERS

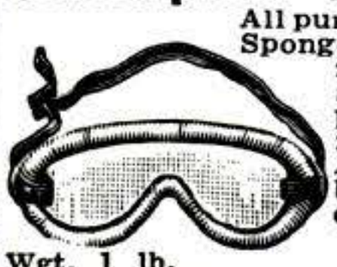
Heavy canvas. Button fastener.
New **No. 530**—Each.....**69c**
Used **No. 119**—Each.....**35c**

ARMY BANDOLEERS



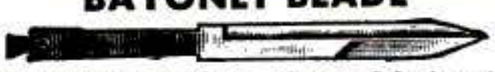
Of fine heavy khaki. Big roomy pockets with snap button fasteners. Fine for hunters, campers, boy scouts, etc., also for shop work in carrying small parts, etc. Material alone is worth this price. Shp. wt. 1 lb.
11 Pocket Type No. **129** Each **49c** | 5 Pocket Type No. **128** Each **29c**

Shatterproof Goggles



All purpose type. Sponge rubber frame. Red shatterproof flexible lens. Adj. head band. With case. New.
Wgt. 1 lb.
No. 139—Each **39c**

BAYONET BLADE



Fine forged steel. Ground but not polished. May be made into throwing or hunting knife or spear. Blade 6¾x⅞ inches, 11¾ inches overall. Will take and hold a fine edge. Shp. wgt. 1 lb.
No. 664-R—Each..... **49c**

STOP WATCH

Genuine Elgin 15 Jewel movement. Ideal for split second timing in racing, sports, time study, etc. Full sweep split second hand graduated in 1/10th seconds. Stem wind, start, stop and reset. Used but guaranteed perfect. A splendid value. Shp. wgt. 1 lb.
No. 200—Each..... **$9.95**

POPULAR RECORD ASSORTMENT

Fifty records of modern dance, race, blues and hillbilly selections. No two alike. Famous name bands and artists included. Used in juke boxes, but guar. perfect. Shipped exp. collect only—no exchanges or refunds. Wgt. 28 lbs.
No. A303—50 records..... **$9.64**

No. A300—25 Records. All Dance. Wgt. 14 lbs..... **$4.88**

No. A301 — 25 Records. Hillbilly, Race and Blues. Wgt. 14 lbs. Set.. **$4.88**

No. 302—25 Records. All Hillbilly numbers. Wgt. 14 lbs. Set.. **$4.88**

FLEX. NECK FLASH LIGHT

Ideal trouble shooter's flash light. Flexible neck lets you direct light around corners and inaccessible spots. Brand new! Plastic case with BX type neck. Uses 2 standard flash light batteries. (Less batteries) Shp. wgt. 2 lbs.
No. 205 Each **$1.69**

RADIO HEAD-PHONES

Extremely sensitive with 4000 ohms resistance. Brand new and fully guaranteed. With moisture-proof cord and phone plug. A splendid value for the radio serviceman and experimenter.
A106—PAIR..... **$2.95**

New supersensitive phones.
A108—Pair **$5.95**

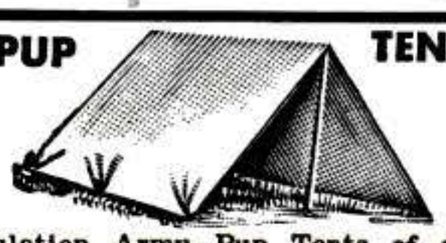
Plastic 8 oz. Flask

For hunters, scouts, fishermen. Waterproof and transparent. Use it for liquids. Use it for matches, flies, bait, etc. Has screw cap top for liquids, plus full open top. Size 5½ x 4⅛ x 1⅛ ins. Has hundreds of other uses. Wgt. 1 lb.
No. A347. Each **29c**

7 LB. EXPERIMENTER PARTS ASSORT. KIT

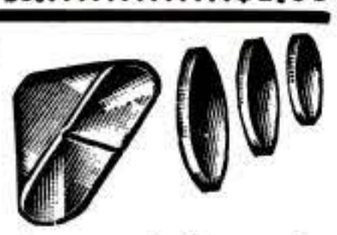
A "gold mine" for the radio serviceman. Hundreds of valuable radio parts, new radar and electronic parts and subassemblies, coils, resistors, trimming condensers—worth many times this low price. **A130R**—7 lbs.... **$1.79**

PUP TENTS



Regulation Army Pup Tents of durable, brown canvas. Used, but in good condition. Fine for campers, outdoorsmen, boy scouts, etc. Wgt. 8 lbs. **A100**—Tent only....**$3.95**
A110—Tent, new **$7.95**
A101—Ropes, wooden poles and stakes for above. Per set.....**$1.00**

27 LENSES, ALL NEW, PERFECT.



For experimental work in optics. Consists of 27 precision ground and polished prisms and lens elements in assorted diameters and focal lengths. Big variety, positive, negatives, etc. Actual value over $100.00. **A519**—27 PIECES **$7.95**

HORSEHIDE JACKET

The leather coat buy of the year! Brand new Army Air Force Type A2 with full length zipper, shoulder straps, knitted waist band and wrists and full satin lining. Finest horsehide — finest tailoring. Order by chest size. Shp. wt. 5 lbs.
No.201 **$22.50**

STIRRUP PUMP

Works with any pail or bucket. Shoots a high pressure stream up to 30 feet. Use it for spraying garden and trees, for whitewashing, fire fighting, drainage, etc. Complete with 10 foot flexible hose. All brand new. Regular $3.80 value. **No. 244**— Each..... **$1.49**

FISHING REEL

Exceptional quality for this low price. Has rugged one piece frame. Ratchet drag. Single action. Attractive catalin handles. Brass bearings for smooth operation. Full 100 yard line capacity. Brand new! A splendid value at this low price. **No. F412**, Each.. **98c**

50 LENSES SEMI-FINISHED

Lenses similar to A519 but not polished. All are blanked and formed ready for polishing. Negatives, positives and prisms in Crown and Flint glass. Worth many times this low price. **A520-50-** LENSES, ONLY.... **$1.95**

VEEDER - ROOT COUNTERS

Three wheel type—counts to 999 and repeats. Geared shaft end may be replaced with a pulley to regulate counting speed. Has hundreds of uses. All brand new. A splendid value. Shipping weight 1 lb. **No. 241.** Each..... **98c**

Officers Watch Compass

Brand new gov't. surplus. Army-Navy model. Single jewel mounted needle. Silver colored dial. A splendid value. Shp. wgt. 1 lb.
A174—Each.... **98c**

BERNARD WIRE PLIERS

Parallel acting jaws. Wire cutter at top. Brand new. Wgt. 2 lbs. **No. 168.** Ea.. **$1.29**

WOOL SLEEPING BAG

G.I. type 100% wool with 30 inch Talon zipper. Used but renovated for reissue. Shp. wgt. 3 lbs. **No. 165.** Each **$3.95**

FLIGHT BOOTS

Gov't. type A-6. For cold weather fishing, hunting, trapping, driving, etc. Genuine shearling full fur lining. Rubber outers. Zipper closing. Heavy soles. Used but reconditioned like new. Give shoe size. Wgt. 4 lbs.
No. 396 Pair...**$5.95**

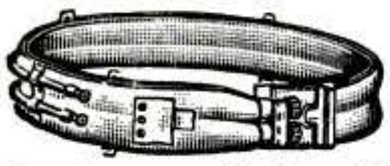
AMMUNITION BOX

Used for 50mm ammunition. Heavy, all metal design with latching top and folding handle. Provides safe, fireproof storage for valuables, etc. Measures 12x6x7½ inches. Used but in new condition. Shp. Wgt. 8 lbs. **No. 338**—Each **79c**

RUBBER SUIT

Fits over your regular clothes and shoes. Can be cut apart for waist high waders, hip high or knee high boots, also arm length rubber gloves. Heavy gum rubber over fabric. Fine for those who work in the water, commercial fishermen, sewer diggers, etc. All brand new! Wgt. 14 lbs. **No. 183** —Each..... **$4.95**

LIFE PRESERVER BELTS



Right from the invasion beaches. Consists of two air chambers. May be inflated automatically with "sparklet" cartridges or manually by attached hose. Adjustable in waist size. One air chamber guaranteed air tight—other may need a tire patch. All belts are used and slightly soiled but a bargain at this low price.
No. 1261—Each.....**$1.00**

SPARKLET CARTRIDGES

May be used with above belts. In boxes of 10. **Stock No. 254.** Per Box..... **50c**

ORDER DIRECT FROM THIS AD

Values galore! Hundreds of hard-to-find items for home, shop and outdoors. Make remittances by money-order, bank draft or personal check. Send 25% deposit on C.O.D. orders. No C.O.D.'s on orders for less than $5.00. Include sufficient postage on parcel-post orders—any overage will be promptly refunded. All quotations F.O.B. Chicago. Used items and materials are guaranteed serviceable and as described. Your money back if not more than satisfied.

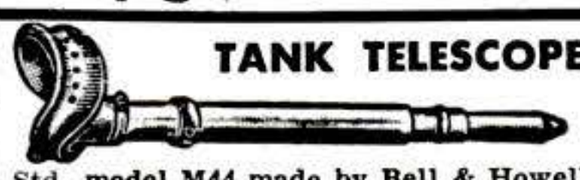
Big Illustrated Catalog Free

WRITE FOR YOUR COPY TODAY

STARK'S

Dept. PS2
509 S. State St.
CHICAGO 5, ILL.

TANK TELESCOPE



Std. model M44 made by Bell & Howell for use as tank scope. Has 17 degree field of view at 39 feet. Highly polished and finely ground optics of 2X power. Rubber eye shield. Measures 22½ in. long, 1¾ in. Diam. Used but perfect. Wgt. 6½ lbs. **No. 522**—Each..... **$6.95**

CAMERA TRIPOD

Purchased from Gov't. Used but perfect. For cameras up to 8x10 inches. Folds to 32 inches, extends to 58 inches. Needs adapter to mount camera. Wgt. 14 lbs. **Stock No. 190.** Ea. **$4.95**

Copyrighted material

POPULAR SCIENCE Classified Opportunities

Save time—Save Money

Classified Ads only 70c per word per insertion, payable in advance. Minimum ad 10 words. To be included in April issue copy should be in our office by February 24th. April issue on sale April 1st.

POPULAR SCIENCE MONTHLY—351 FOURTH AVE.—NEW YORK CITY 10

12 AUTOMOBILES

HIGH Compression heads. V-8. More speed, acceleration, power. Offenhauser or Edlebrock $75.00 Complete set. Dual manifolds complete with throttle kit, fuel lines. Edlebrock $49.00. Offenhauser $55.00. Give make, model V-8. Catalog 10c. Clymer, Dept. B-23, 212 W. Pico, Los Angeles 6, Calif.

RACING Car Equipment for all cars, Engines, Racing Heads, Manifolds, Carburetors, Mufflers, etc. Speed instructions and literature $1.00—refunded first order. Lee Motorcraft Co., 1412-B Great Northern Bldg., Chicago 4, Ill.

HOT-Rod manual, fast Fords, photos, instructions, $1.50 air mailed $1.75. Racing parts list $.25. Hollywood Hot-Rod Los Feliz, Box 9626 S, Hollywood 27, California.

KAISER-Frazer, Floyd Clymer's new book (no connection with Kaiser) gives uncensored, impartial report 3000-mile test including Pike's Peak, Kansas City-Denver record runs, economy test. Part by part equipment analysis. Good, bad comments, no punches pulled. $1.50 postpaid. Clymer, Dept. B-21, 2125 W. Pico, Los Angeles 6, Calif.

AUTO Mechanics. Lick those "What is it?" knocks and rattles with "Electronic Snooper." A "headache" saver. Inexpensive. Build it yourself. Brownie's Repair, Arvada, Wyoming.

USED-CAR Buyer's Handbook. Save dollars, grief. Photographs, dealers' tricks, complete tests. $1 pp. Post Publications, Box 723-TC, Arcadia, California.

AUTO Repair manuals, by Victor Page. Complete non-technical data all mechanical features, operation, repair. Ford V-8 cars, trucks, 823 pages, 369 illustrations. $3.50 postpaid. Chevrolet Six and truck, 896 pages, 363 illustrations, $3.50 postpaid. Clymer, Dept. FC-2, 2125 W. Pico, Los Angeles 6, Calif.

CUSTOMIZE Your automobile! Revised, enlarged book, latest restyling, complete, sharp. 50 photographs! $1 pp. Post Publications, Box 723-SC, Arcadia, California.

BUILD automatic clutch, scooters, midget autos, tractors, shop machines. Catalog Free. Nichols Equipment Co., Dept. 512, Purvis, Miss.

1947 INDIANAPOLIS Race History. Enlarged, 56 pages, 125 photographs, charts, complete details, cars, Drivers, specifications. $1.00 postpaid. 320-page Indianapolis history book 1909 to now $3.50. DeLuxe Edition $5.00 Postpaid. Clymer, Dept. B-20, 2125 W. Pico, Los Angeles 6, Calif.

FROM speedway to roadway! Track-proved Hi-Speed Heads and Manifolds now available for passenger cars! No special tools needed! Increase horsepower 25%! Astounding getaway! Free illustrated catalog. Speedsport, 5747-J, Waveland, Chicago 34.

AUTOMOBILE Racing Book, Fifth Edition—Revised. Tells how to build dirt tracks bodies, frames, engines. Records, superchargers, rules, formulas, plans, stock conversions, roadster racing, fast Fords. $1.00 postpaid; $1.15 C.O.D. Ray Kuns, Department 274, Madisonville, Cincinnati, Ohio.

CUSTOM-Car Photograph Album. Fascinating automobile style classics! Coachcraft, Summers, independents, photo-packed! $1 pp. Post Publications, Box 723-AC, Arcadia, California.

CLYMERTONE, Twin muffler sets, beautiful sound, complete with necessary welded pipes, E-Z installation. Ford V-8, $20.00. Chevrolet set with split manifolds, $37.50. Specify car model. Clymer, Dept. B-24, 2125 W. Pico, Los Angeles 6, Calif.

No. 4 CLYMER Historical Scrapbook. Entirely new, different, 224 pages, advertisements, photographs 250 early automobiles, motorcycles, $1.50, DeLuxe Edition $2.50 postpaid. Clymer, Dept. B-28, 2125 W. Pico, Los Angeles 6, Calif.

AUTOMOBILE Racing Sixth Edition. 100 illustrations. Working drawings with building instructions for Ford-60 midget, California roadster, Offenhauser racer. Details on racer parts. Sample entrance blank. World's record 158.5 M.P.H. rear engine four-wheel drive car. Interesting information for fans, drivers, mechanics. $2.00 postpaid; $2.25 C.O.D. Ray Kuns, Department 62, Cincinnati 27, Ohio.

BRITISH Sports cars. New book. 96 makes described. Fine illustrations, specifications. $2.00. DeLuxe Edition $3.00 postpaid. Clymer, Dept. B-27, 2125 W. Pico, Los Angeles 6, Calif.

DUALTONE Crystalline packed, California mufflers, single or twin for all automobiles. Carburetor Velocity Stacks. Compression cylinder heads. Dual manifolds. Large double or single chromed tailpipe extensions. Chromed Station Wagon Stacks. Fender Skirts. Request Catalogue. Dualtone Mufflers, 2636B India Street, San Diego 1, Calif.

REX MAYS Racer $3.00. Kun's Auto Racing Book 6th Edition just out $2.00 postpaid. Clymer, Dept. B-29, 2125 W. Pico, Los Angeles 6, Calif.

BUILD speedy midget track racer from castoff parts! Plans, specifications, construction information, $1.00. Motor Supply, Box CS-1682, Toledo, Ohio.

RACE Driver History. Complete information every driver competing Indianapolis "500", 1911 to present, 313 drivers performance records every year alphabetically arranged. $1.50 postpaid. Clymer, Dept. B-RD, 2125 W. Pico, Los Angeles 6, Calif.

"VAPO-STEAMATIC"—Water Injection. Easily constructed (For less than $1.00). Finest automatic "moist-humidity" system. Engineering triumph—gets up to 33 miles per gallon! Reduces wear, sludge. Tremendously increases horsepower. Acceleration! Eliminates ping, carbon, overheating. Smoother engine. Copyrighted, fully illustrated "Installation-Handbook", including additional "Injection-Conversions" covering tractors, airplanes, motorcycles. $1.00. Newhouse Industries, 5941-A Hereford, Los Angeles 22.

HOTROD and fast car equipment. Heads, camshafts, dual manifolds, mufflers, etc. List 25c. Build up your V8 or Chevrolet for racing, hotrod, or hot stock-car. Specify which make. Instructions $1.00. Alden Motors, Oakland City, Ind.

BRITISH Cars. New, unique book illustrates, describes 34 British Postwar cars, all makes, models, 67 beautiful photographs. A real catalog. Just out. $2.00. DeLuxe Edition $3.00 postpaid. Clymer, Dept. B-PW, 2125 W. Pico, Los Angeles 6, Calif.

DRIVE a new King Midget, world's lowest priced automobile. We supply all parts ready to bolt together. 45 miles per hour, 90 miles per gallon. Beautiful racer-roadster body. Full accessories, including ski adapters for snow and ice. 24-page assembly book, drawings, photos, blueprints plus detailed illustrated circular $1. (refunded first order). Circular only 25c. Midget Motors, Athens, Ohio.

BRITISH Motor Industry. A review 1896 to 1946. 176 photographs, charts, drawings. Names, addresses all British manufacturers. Contains everything pertaining to British Auto Industry. Old and new cars shown. 52 large pages. $1.50 postpaid. Clymer, Dept. B-BM, 2125 W. Pico, Los Angeles 6, Calif.

MODERNIZE your car with push-button controlled parking brake! Illustrated instructions $1. Chas. Gates, 301 Ross, Pecos, Texas.

INTERCHANGEABLE Parts Book. New book tells every automobile part that interchanges with others. Same parts many times vary 100% in price. This book enables garages, mechanics, dealers, owners to buy under cheapest listing. Tremendous savings for users. $15.50 postpaid. Clymer, Dept. B-IP, 2125 W. Pico, Los Angeles 6, Calif.

"SPEED & Mileage" manual—The original! Obtain greater speed, mileage, racing performance from any automobile! Large illustrated book gives easiest methods! Simplified speed tuning! Racing secrets! Gas saving tips! Instructions on building speed equipment, economizers, duals, mufflers, manifolds, heads, superchargers, jet, water injection, fuels, fast conversions, engines, "Hot-Rods". Also, streamlining—customizing suggestions, photographs! Parts lists! $1.98. Almquist Engineering, Box 660-N, Brooklyn 1.

"1948" CUSTOM Styling Manual. Easily make car look Hollywoodized, custombuilt, ultrabeautiful! Latest customizing, restyling, streamlining methods simplified for all cars. 100 photographs, illustrations, instructions. Also, model changes. Accessories, mufflers, engine "Hop-Up" specifications! $2.00. Almquist Engineering, Box 660-N, Brooklyn 1.

1948 SUPERIGNITIONITER atomic starting, pep, mileage. $5.50. EG Mfg., 355 East 149, New York 55.

13 AUTO SUPPLIES & EQUIPMENT

AUTO parts, New or rebuilt. Prompt shipment. Write requirements. Save money, buy direct. Factory warehouse. Mechanics Auto Parts, 3807-PS North Ashland Ave., Chicago 13.

SENSATIONAL seat covers. Jobber's discounts. Mono, 6545 Santa Monica Blvd., Hollywood, Calif.

PISTONS: Old & New Cars. Discounts. M. Merryman, Lawndale, Calif.

Copyrighted material

PLATING Outfits For Autoparts. Connect to a battery. No tanks used. Outfits furnished. Free particulars. Gunmetal Co., Ave. K. Decatur. Ill.

AUTO parts for all autos and trucks. Trans. motors. differentials. fenders. carburetors. Also Body Parts. Security Auto and Truck Parts. 1923-BP Grace. Chicago 13.

SPEED and Power handbook—Construct own super-chargers. water injectors. compression heads. fuel saving devices! Get racing speed. acceleration. dynamic power increases from any car. Mileage tips! Speed secrets. Ignition tuning! Hot-rods! Carburetion tricks. Fuels! Including "Restyling Ideas"—streamlining. model revising! Customizing. Accessories! $1.98. Newhouse Industries. 5941-A Hereford. Los Angeles 22.

AIR feed needle. for all cars-trucks-tractors. 10% more mileage guaranteed. or your money back. Ten days free trial. $1.50 PP. State make & year of car-truck-tractor. Send card for Data on $17.50 Octa-Gane water injecting carburetor. Advanced Automotive Products. 563-0 Lake Road. Webster. N. Y.

WELDING bodies. repairing fenders pays good profits. Easy with Hobart A.C. Welders. Catalog free. Write Hobart Welders. Box P-282. Troy. Ohio.

AUTO parts—new or rebuilt—for all cars. Starters. generators. clutch assemblies. transmission and differential gears. Everything you need. We have large stock. —Can ship fast. Write us Grove Auto Supply. Dept PS. 4854 Cottage Grove. Chicago. Ill.

CONVERTIBLE Owners—Get that "New Look." Put one of our easily-installed ready-made tops on your convertible Directions and all necessary trim included. Choice of tan or black first quality material. State car make and model. One price —$39.50. Rio Top Company. 1370 Roanoke Avenue. Newport News 2. Virginia.

BRIGHT Illumination! Simply plug Trouble-Lite into cigarette lighter socket. Compact. long cord. folds up completely. $3 65 prepaid. Large discount. dozen. Novel Products Company. 1284 Clifford Ave.. Rochester. N. Y.

"SPEED" handbook—The original "Hop-Up" publication—Shows how to easily speed up stock automobiles! Simplified "Tuning" includes instructions on building speed equipment. fast conversions. engines. "Hot-Rods". superchargers. mufflers. manifolds. heads. fuel formulas. water injection. Streamlined bodies. Also. racer. midget. boat. roadster information—Racing secrets. specification. photographs. parts lists. etc.! $2.00. Almquist Engineering. Box 660-N. Brooklyn 1.

CARBURETOR repair kits. miscellaneous parts for most popular carburetors. Carburetor Service. 600 La Prairie. Ferndale 20. Mich.

AUTOMOBILE glass! Rubber mats! Shock absorbers! Lowest quotations. Special! Ford. Chevrolet. 1933-47. Rubber jute backed mats: $3.75 Cooper's. 3137 Lawrence. Chicago 25.

BERMUDA Auto Bells—Brass. nickel plated. two loud tones. no wiring. easily installed under floorboard. 16 Concord St.. West Hartford 7. Conn.

14 AUTO TRAILERS

BUILD your own Trailer! Save Money! Have every feature you want! Plans for House. Sport. Camp and Utility trailers Catalog describing 9 models 10c. (15c in Canada and overseas). Jim Dandy. Box 125-B. Wausau. Wisconsin

TRAILERCOACHES — learn about all types—sports. living or travel. Approximately 100 pages monthly—magazine tells all. Special rate $1 the year in U.S.. $1.50 to Canada. $2 Foreign. Trail-R-News. Box 431-C. Glendale. California.

TRAILER Plan Booklet—house. sport. Etc.. 25c—Complete parts. accessory catalog. 25c—Book "Trailer Building" 50c. All three books $1.00. Marine Mart. Buffalo 7. N Y.

91 MOTORCYCLES, BICYCLES, SUPPLIES

WHEELS! Build wagons. scooters. mowers. trailers. wheelbarrows. grocery carts. baby carts. play pens. baby carriages. 4" to 16". Free list. Trulsen Mfg. Co.. 811 E. 31. Kansas City. Mo.

LARGE stock Indian parts. Expert motor rebuilding. New and rebuilt Chief Motorcycle. motors only. Indian Motorcycle Sales. Kansas City 1. Mo.

WHEELS. Tires. Tubes for Motor Scooters. Midget Cars. Wheelbarrows. and Industrial equipment. All sizes. Bicycle Parts. accessories. Largest stock in United States. Send dime for list. Cycle Transport Company. 1241 S. Michigan Ave.. Dept. C. Chicago 5. Illinois.

NEW! Motorcycle seat covers. bright colors. molded cushion. $6.75. Chrome seat springs. fit British machines. pair $6.75. Finest leather jackets. $36.95. Free folder! Pacific Cycles. dept. B3. 1208 Pine. Seattle. Washington.

MIDGET racer $40. Cushman motorscooter $15. motorbike outfit $15. Harley-Davidson motorcycle $35. Send 25c for new catalog #12 listing amazing bargains in motorscooters. motorbikes. midget cars. motors. parts. Gail. 538 Erie. Toledo. Ohio.

MIDGET automobile $15. Cushman motorscooter $20. Indian motorcycle $30. tires 75c. Send 25c for Spring catalog #940 listing sensational bargains in motorscooters. Servicycles. midget cars. used motors. parts. Associated. Box CS-1764. Toledo. Ohio.

BUILD America's lowest priced motorscooter speedster! Complete plans. specifications. $1.00. Big list bargain priced used motors. etc.. included free! Motor Supply. Box 1682-CS. Toledo. Ohio.

"PROFESSIONAL Midget racer. motorscooter. midget roadster. midget motorcycle. Plans. specifications contained in illustrated handbook. 25c. Big list bargain priced used motors. motorscooters. Servicycles. etc.. included free! Midwest. 3839 Drummond. Toledo. Ohio."

AUTO-PED motorscooter $10; Midget Racer less motor $14; Midget track racer. new motor $65; Indian '45 motorcycle $45; Indian Chief $40; Harley single engine $4; Whizzers $30 up; 4500 small tires $1 up. Mail order only. Plenty brand new and surplus gasoline engines. motorscooters. midget cars. Send 25c for Big War-Bargain Catalogue Number 23. just out. listing the above and over 400 other bargains in motors. motorscooters. midget racers. parts. plans. etc. (35c by First Class Mail.) Midget Motors Directory. Athens. Ohio.

NOW Available! For All 1945-46-47 American Moto-Coots Bendix Lighting System Generator. Sealed beam headlight with Attachments. Give model when ordering. Genuine Moto-Scoot Parts Also in stock. American Moto-Scoot Co.. 630 W. Lake St.. Chicago 6. Ill.

FLAT Rate Repair Manual for Harley-Davidsons. Gives flat rate charge for every operation. Every dealer. owner. mechanic needs this new book. $2.00 postpaid. Clymer. Dept. B-FR. 2125 W. Pico. Los Angeles 6. Calif.

T.T. RACING. New exciting. accurate book of world famous English road racing history. Just printed. $3.00 postpaid. See our advertisements under autos. Clymer. Dept. TT-2. 2125 W. Pico. Los Angeles 6. Calif.

MOTOR Scooters. bicycle engines. 120 miles gallon. Dime for catalog. Clymer. Dept. B-25. 2125 W. Pico. Los Angeles 6. Calif.

MOTORCYCLE parts and pistons. new. used.. Harley. Indian. Henderson. Super-X List 10c. Ballak. 811 N. 9th. St. Louis 1. Mo.

15 AVIATION

GIANT Glider Kites. Double. 14x10 ft. Lifts 100 lbs.. tows car. etc. Cost Government $108. Yours for $20. Satisfaction guaranteed. Great Northern Mart. North Adams. Mass.

PROPELLERS—2 & 3 blade. for snow-ice sleds. boats. Catalog. Standard Aerocraft. Box 387. Ft. Worth. Texas.

VETERANS: Flight training under the G.I. Bill. Private. Commercial and Flight Instructor Ratings. Write for information. Gottschalk School of Aeronautics. Adrian. Michigan.

PROPELLERS for sleds. air-boats. catalog 10c. Banks-Maxwell. R.F.D. 7. Ft. Worth.

WAR surplus releases—aerial cameras. $175.; Gun Cameras $30.; Elgin Stop Watches $7.50; Hamilton Navigation Watches $27.50. Sextants $12.50 (Free Folder). Pan American Navigation Service. Div. 3. 12021 Ventura Blvd.. N. Hollywood. Calif.

49 ELECTRICAL SUPPLIES & EQUIPMENT

UNUSUAL Gov't surplus item—Airplane Lights—New ideal for boats for path clearance signal or flashing—excellent for road trucks—busses—construction night work—has powerful beam—operates on 27 Volts or 110 Volts with transformer—complete with powerful motor to rotate beam—A value of a lifetime! Two complete units to a set—Now! $19.50 set—three for $50. "Amazing Bachman's." 25 Herman Street. Rochester 5. New York.

FREE Catalog—Motors. welders. welding supplies. generators. fencers. electric mowers. freezers. other electrical items. LeJay Company. Minneapolis. Minn.

APPLIANCE Servicemen: Construct your signalling Iron Tester with Pyrion's thermo-electric relays which "sounds off" when proper adjustment temperature reached. Also prevents iron overheating if forgotten! Automatic. Absolutely no attention required. Price $6.25. Other parts available anywhere for less than $2.00. Pyrion Controls. 2215 Moore Ave.. Anniston. Alabama.

SIGNALLING Light—New—Gov't Surplus—an exceptional value for boats—construction work—scouting—etc. Powerful light with three filters and case—at a fraction of cost—Operates on 27 volts or 110-volts with transformer—While they last $7.95; Three for $20. "Amazing Bachman's." 25 Herman Street. Rochester 5. N. Y.

LAMP parts. electrical repair parts. wiring supplies. New wholesale catalog—10c. Gearon Company. 6405H North Oakley. Chicago.

AMAZING New pencilator. It gives you ohm's law. Wire sizes and amperes to 60 h.p. a.c.-d.c. and 3 phase current. A guaranteed mechanical pencil for only $1.50. H. E. Zarek Co.. Dept. 1. 317 W. Palm St.. Compton. Calif.

SELSYN motors. 3½ x 5½ heavy duty. 115 volts. 60 cycles. $10.25 per pair. Weber. 150 Maple. Hershey. Pa.

ELECTRIC Pencil: Engraves all metals. $1.00 Postpaid. Beyer Mfg.. 229-C. Uniontown. Pa.

AMAZING Communication Unit! Remote controlled to send messages house to barn to shop etc. Communicate with Dad working in the garage or Junior in the attic. Contains two identical set-ups with buzzers —lights—remote control transformers and dial with codes. Operates on regular house current ready to operate—simple to connect —Unlimited uses. Only $14.95—Three sets for $40. "Amazing Bachman's." 25 Herman Street. Rochester 5. N. Y.

LAMPS—All parts to build or repair. Catalog 10c. Gyro Lamps. 5416B Clark. Chicago 40.

ELECTROPLATING Has a thousand and one uses when working with electrical supplies and equipment. Warner Electroplaters. permit you to easily plate chromium. gold. silver. nickel. copper. etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write today for free samples and literature. Warner Electric Co.. Dept. ES-P2. 1512 Jarvis Avenue. Chicago 26. Ill.

140 WELDING, SOLDERING

WELD. cut. braze. with gasoline! Amazing discovery releases tremendous heat cheaply from gasoline. Shatters welding costs. farm. factory. shop. Important news! Write: Matthews Mfg. Co.. Calgary 22. Canada.

Copyrighted material

ACETYLENE Welding & Cutting Outfit, complete with cylinders. You own the cylinder. No rental. Free literature. A-A Welding Supply. P9228 So. Ada. Chicago 20. Ill.

WELDER—New portable champion special Transformer Welder; 110/220 volts, AC. 8 heat stages. Welds, brazes, solder, cuts all metals. Complete with electrode holder, helmet rods, carbons, fluxes, cables. Also special Flame Weld Torch. Easy to use. Full directions. Splendid for shop, farm and home repairs. Guaranteed. Only $27.50. Money back guarantee. Also resistor model. Now $14.95. Magic Welder Co., 239 PS Canal St., New York, N. Y.

"BUILD-Ur-Own" Portable arc welder. Save $300. Easy with Hobart Generator plus auto engine. Free instruction book. Write Hobart Welders, Box P-283, Troy, Ohio.

ELECTROPLATING Has a thousand and one uses. Warner Electroplaters permit you to easily plate chromium, gold, silver, nickel, copper, etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write today for free sample and literature. Warner Electric Co., Dept. WS-P2, 1512 Jarvis Avenue, Chicago 26, Ill.

HEAVY-Duty, 110/220v A.C. arc welders. R.E.A. approved outfits. Williams Company, Box 4100, Portland 8, Oregon.

A. C. Welders—Torches, helmets, sanders, bargains. Holgerson Co., Canton, Kan.

6 AIR CONDITIONING & HEATING

FURNACES, conversions, gas oil, L.P. Easily sold. Write for literature. Thuman Equipment, 1225 Fifth Avenue, St. Joseph, Mo.

80 MACHINERY, TOOLS, SUPPLIES

MECHANICS—Machinists—Hobbyists—Amazing dual-drive assembly, geared 7 to 1 reduction, is driven by powerful 1/5 HP AC or DC Motor, operates on 6-27—or 110 volts with transformer. Simple standard attachments convert this amazing unit into a dual—hand or table drill—polisher—buffer—router—sander—countless other uses. May be used as individual drill—sander—etc., by detaching flexible drive shaft. Complete with step down transformer, worth half the investment—which can also be used to convert nearly all air-craft motors to regular house current. $300.00 value! While they last, $19.50. No C.O.D. "Amazing Bachman's", 23 Herman St., Rochester 5, N. Y.

DRILL GRINDER—Grinds drills to factory accuracy. Calipers with direct reading scales. Circle cutters. New Tool grinder. Lowest prices. Free literature. Factory, 811-A East 31st, Kansas City 3, Mo.

GEARS For inventors, experimenters, model makers, schools, work shops, laboratories, etc. Government surplus made of brass, bronze, dural steel and stainless steel. 12 matched pairs; 24 gears, bevel, spur and ratchet. List price $12.00, our price $2.50. 25 matched pairs; 50 gears, includes larger gears, also sets of worm gears. List price $30.00, our price $5.00. Limited quantity. Order now. Write for our bulletins on ball bearings, rectifiers, Relays, Selsyns, Horns and government surplus materials. Met Exchange, 323 Canal Street, New York.

WAR Surplus Special: Big 50 lb. box popular size bolts, nuts, washers, screws, clamps, etc., $6.85. War Surplus Co., Box 910, New Brunswick, N. J.

FOUNDRY Castings, Blueprints, Materials for woodworking and metalworking machine tools. Suitable for commercial or home shop production. 23 items. Catalog 10c. Lewis Machine Tool Co., 3217 Union Pacific Avenue, Dept. S, Los Angeles 23, Calif.

TAPS, Dies and other tools direct by mail. Free catalog. King Tap & Tool Co. Inc., North Attleboro, Mass.

MODERATELY Priced, Available Now. Portable Electric Sander. Woodworking power tools, Shaper, Bandsaw, etc. Paint Sprayers, Armand Grinder for schools, home work-shops, cabinet-makers, farmers, garages, repair shops, others. Postcard brings free bulletin. H. Saltzman Co., 118-14 83rd Ave., Kew Gardens 15, N. Y. Dept. R.

CONCRETE Block machines $39.50 up. Catalog free. Concrete Mold Company, 5466 Gravois, St. Louis, Missouri.

REVOLUTIONARY power tool saws or files with hand drill. Distributors wanted. Dangerson, Georgetown, Colorado.

"WAR Surplus" Bargains! All new! Flexible Drive Cables! Three sizes, 10"—25"—72". Over $5.00 value. Combination offer of all three sizes, $1.75—Precision built Right Angle Drives. Complete with flexible drive cables. Only $3.50—Magnet wire ½ lb. coils No. 22, 10 rolls for $3. 27 volt geared head (120 RPM) motor $30.00 value—all new Special $2.95—Bushings and Spacers—all new—aluminum and steel, 25 variety assortment—Special! Minimum 5 pounds $4.75. Bolt and screw assortment—over 50 varieties—Special! 5 pound $4.75 Rivet assortment—copper—steel—aluminum—over 250 varieties—Extra Special! 5 pound minimum $4.75. Micro Switches—new—6 variety assortment—$15.00 value only $4.75. Order today! No C.O.D. "Amazing Bachman's", 23 Herman Street, Rochester 5, N. Y.

HEATING Section, low cost Automatic Air Cooler, forced Air furnace, Filter Ventilator. Practical one unit design fits closet, basement, attic. Build your own with easy to understand step by step plans. No expert knowledge or special tools required $2.95. Lake Engineering, Clearlake Park, Calif.

MACHINE shop tools released for private industry; 14" x 6' engine lathe $160. 16" x 6'—$180. Automatic screw machine $300. Quick Change lathes $400 to $600. Gear hobber $240. 3ft Radial drill light pattern $180. Heavy duty type $420. 24" x 8' lathe $340. Monarch 16" x 5' Geared Head Quick Change lathe $560. Production miller $240. 20" Shaper $340. 5 H.P. single phase motor $100. 3 H.P.—$85. Ransome welding positioner $180. 30" Band saw $275. Van Norman, "Relio" automotive grinder $140. Money back guarantee. Conversion Parts Co., 277 Adams Street, Boston, Mass.

YOUR Drill press a lathe! Write—Edwards Specialties, Box 687-A Alhambra, Calif.

9" LOGAN Lathe—brand new—$159.50. 18" between centres—immediate delivery—send for circular. Travers Tool Co., Dept. P, 5 Court Square, Long Island City, N. Y.

ELECTROPLATING Has a thousand and one uses when working with machinery, tools and supplies. Warner Electroplaters permit you to easily plate chromium, gold, silver, nickel, copper, etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write Today for free sample and literature. Warner Electric Co., Dept. MTP-2, 1512 Jarvis Avenue, Chicago 26, Ill.

METALWORKING, woodworking equipment—your price. Bulletin 10c. Machinery, Newfane 1, Vermont.

LATHE boring and threading done fast and accurate with America's newest low priced bar holder. Free literature. Miles Products, 2532 Wabash, Chicago 16.

DRILL GRINDER for twist drills $2.95. See ad on page 268.

METALS; Aluminum, Brass and Steel in all shapes. Write for free catalog. F & H, 87 Warren St., New York 7, N. Y.

79 MACHINERY FOR SALE

BEECO—The machine that sharpens lawnmowers like new — 4148 Cornwall, Berkley, Michigan.

17 BATTERIES, GENERATORS, ETC.

NEW Double voltage generator 115 volt 1200 watt A.C., S.O. & 28.5 volts x 200 Amps. D.C. excellent for welding generators, lighting plants & experimental work. Shp. Wt. 60 lbs. No conversion necessary, results of huge purchase. Your cost only $19.75 f.o.b. Surplus Sales, 24th St. & Cudaback Ave., Niagara Falls, N. Y.

19 BOATS, OUTBOARD MOTORS, ETC.

STREAMLINE stabilizing Pontoons for canoes, kayaks. Pair $9.95. Lorenzen Industries, Niles, Michigan.

FULL size, cut to shape boat patterns, blueprints, 7½—28 feet. Illustrated "Build a Boat" catalog, 10c (coin). "How to Build Boats" book, $1.00. Cleveland Boat Blueprint Co., Dept. A-77, Cleveland, Ohio.

MARINE Power—Easily convert any Ford and Jeep motor (domestic and foreign) with Osco parts and kits. Complete catalogue 25c (coin). Osco Motors Corp., 2020C E. Orleans St., Phila. 34, Pa.

"PLYWOOD Rowboat and Motor Boat K.D. Kits. Assemble and save up to $57.50. Three popular models. Resin bonded, waterproof plywood construction. Easy to assemble in spare time. Write for free literature and complete specifications. C. R. Dillabaugh Boat Co., 7928 N. E. Mallory, Portland 11, Oregon."

See display ad page 71; Boat Patterns and Kits. Marine Mart, Buffalo 7A, N. Y.

INBOARD hulls, outboard runabouts, hydroplanes, hunting, fishing boats, boat kits, boat trailers. Huebl Boats, LeSueur, Minn.

"MARINE conversions for Ford and Jeep engines. Catalog 10c. Lehman Manufacturing Company, Department A, Newark 2, New Jersey."

PLEASURE and profit fishing boat plans, $1. Albert Schantz, Baden, St. Louis 15, Mo.

"OUTBOARD motors—good values, used motors. Also used parts for most makes and models. Crandall-Hicks Co., 912 Commonwealth, Boston, Mass."

SAILS, canvas, Marine hardware, Wingdope, boat paints, Korodless wire, canoe, sailboat, motorboat fittings. Catalogue 10c. Alan-Clarke, 96 Chambers, New York City 7.

BUILD Your boat from paper patterns, forty years careful designing, send 10c for folders. Latest manual, small boat construction, $1.50 postpaid. Germain Boat Company, Dept. I, Saginaw, W.S., Mich.

AIRPLANE Jettison tanks—streamlined, 10½ foot, tear drop shaped, 165 gallon. Of light weight lead coated steel, weighs 75 pounds. Floats over 12000 pounds. Ideal for making trim, inexpensive boats, canoes, kayaks, dinghys, duck boats, powered catamarans and runabouts. Prices $12.50, $9.75 each for three or more U. S. freight prepaid. General Sales, 205 Market, Grand Rapids 3, Michigan.

ATTENTION sportsmen! Assemble Kayak from easy construction kit complete! Nothing additional needed! Play-acks, Dedham, Mass.

51 ENGINES, MOTORS, ETC.

RANGER Engine—Aircraft—All New in original case, 570 HP, 12 cyl. V type. Engine Spec. No. 177. Complete with spark plugs. Original Government cost over $12,000.00 each. Special offer $200. Crated weight 1200 lbs. No COD. Write for complete description. "Amazing Bachman's", Dept. PS, 23 Herman Street, Rochester 5, N. Y.

WINDING Data, listing 225 motors, single and three phase, $1.00. Motor Data, Box 7631, Kansas City 3, Mo.

DYNAMOTORS. All New! 400-cycle. GE5D21NJ3A. 27 VDC to 100VAC. 485 watts. Sensational offer! $8.00 each. Three for $20.00. Order today! No COD. "Amazing Bachman's", 23 Herman St., Rochester 5, New York.

MOTORS! ½ HP—d.c. converted to a.c. All new. High speed 110 volt, 25 or 60 cycle, ball bearing motors. Actual value about $75.00. Now $15.00 each or 3 for $40.00. Countless uses for home mechanics. Can be used in any position. Order Today! Immediate Delivery! No c.o.d. orders. "Amazing Bachman's." 27 Herman Street, Rochester 5, N. Y.

SIMPLEX water motor—fractional H.P. Sizes 1/10 H.P. $3.50. ⅛ $5.50. ¼ $7.50. ⅓ $9.50. ½ $12.50. ¾ $16.50. One H.P. $20.00. Jan., Feb. Specials while they last Express Prepaid. Duplex Motors, Burlington, Iowa.

AMPLIDYNE Motor-Generators. All Packed—New! GE5AM 31Nj9A. Output 60 VDC, input 27 VDC, 530 Watts. Original cost $120.00. Now! $7.95 each. Three for $20. Order Today! No COD. "Amazing Bachman's", Dept. PS, 23 Herman Street, Rochester 5, New York.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

GAS drive arc welders. "Build Your Own." Portable, goes everywhere after profitable jobs. Free instruction book. Write Hobart Welders, Box P-284, Troy, Ohio.

WELDING Generator, 150 ampere, $47.50. Other bargains. Butler, 1885 Milwaukee, Chicago.

MOTOR repair men, get our bulletins on stator winding tester, and A. C. motor winder. Motor Industries, Quincy, Illinois.

SELSYNS—All New! Transformers—GE Model 2J1G1, 57.5—57.5V 400 cy; Generators—GE Model 2J1F1, 115—57.5V 400 cy. With gears. Sensational offer! $1.50 each. Quantity lots $15. dozen. Order Now! No COD. "Amazing Bachman's". Dept. PS. 23 Herman Street, Rochester 5, N. Y.

MOTORS, generators; any H.P.—voltage; AC or DC; Rebuilt. Year guarantee. Roberts Electric, 7232 Madison, Forest Park, Illinois.

7 AMERICAN POLICE JIU JITSU

DEADLY Judo—Fiercest fighting technique. Trick knockouts. (200 photographs —plus illustrations.) Expert instructions—Three volumes. Complete $2.25. Variety House, Box 46-AA, Wall Station, N.Y.C. 5.

20 BODY-BUILDING COURSES

HANDBALANCING, self-taught. Write. Power, 923 W. Vine, Kalamazoo, Michigan.

PHYSIQUE Studies 150 different poses $1.00. Gene Jantzen, Bartelso, Illinois.

BAR-BELLS, Dumbbells, Exercise equipment, Courses, Free booklet. Good Barbell Co., Reading, Penna.

BARBELLS! 95 pound set $9.80; extra plates 9c pound. Send for free course and catalog. Bur Barbell Co., Lyndhurst, N. J.

124 SPORTING GOODS, GUNS, FISHING TACKLE, ARCHERY

SKI-TOWS. Portable. Auto-powered. 500 ft. long. Pulls you both ways. Up, level or downhill. Set up in 20 minutes. Only $125. Send card for particulars. Great-Northern Mart. North Adams, Mass.

LUMINOUS Worms—Best fish catchers you ever used or money refunded. 24 inches only $1.00 Postpaid. Porko, 7105S Glenwood, Chicago 26.

5000 BARGAINS, firearms, binoculars, war relics, catalog 40c. Smith Museum, Runnemede, N. J.

"SHOTGUNS"—"Rifles"—"Handarms" —"Ammunition"—"Rods"—"Reels"—List 10c. Rudolph's, Atchison, Kansas.

FREE catalog of Archery Raw Materials to build your own bow and arrows. Fisher-Smith Co., 707 E. Mulberry, Bryan, Ohio.

SEND 10c for list 100 new and used guns. Frayseths, Wilmar, Minnesota.

CLOSING Out:—435 antique Firearms:—35,000 coins, relics, cartridges, swords, flintlocks, carbines, minerals, antiques.—Illustrated Catalog 25c. Heike, Wenona 2, Ill.

ANTIQUE firearms, swords, daggers. Catalogue 10c. Nagy, 8-A South 18th, Philadelphia 3, Penna.

FISHING Canes: 50 or 5,000. Steel rod $2.75. Jointed cane $2.75. Jointed aluminum rod $6.95. Baseball bat $3.35. Ferrules, guides, grips, butts, clamps, lines, lures, reels, reel seats, creels. Many other fishing items. Dealers write. Bob Pace, Combs, Ark.

55 FIELD GLASSES, TELESCOPES, ETC.

TELESCOPES, Binoculars, Microscopes, —big bargain catalog free. Brownscope Company, 24 West 45th Street, New York.

REFLECTING Telescope, complete 3½" diameter, equatorially mounted. View planets, stars, $19.75. Write Skyscope Co., 475-5th Ave., New York.

PORRO prisms 6x30, 7x50 binocular, 50c each. Ross, B-68 West Broadway, New York, N. Y.

POWERFUL Astronomical telescopes easily made. Perfect lenses and instructions; 100 power $3.00, 100 and 200 power $4.00, 100, 200 and 400 power $6.00. Clear vision and full power guaranteed. Instructions alone 10c. Suffolk Science Service, Manorville, N. Y.

VARIABLE density, Polaroid filter device, 2⅞" diameter, $2.35. Glass only 2 for $2.00. Ross, B-68, West Broadway, New York, N. Y.

POWERFUL astronomical Refracting telescope, equatorially mounted, all metal, two eyepieces, $16.50. Bluhm Optical Lab., 1270 E. 83rd, Cleveland 6, Ohio.

ARMY-Navy surplus. Telescopes, Binoculars, lenses, prisms, etc. Send 3c stamp for "Bargain" list G1. A. Jaegers, 123-26 Rockaway Boulevard, South Ozone Park 20, N. Y.

MICROSCOPES—professional standards, hobbiest prices. List free. Mission Mart, 818 Fort Stockton Drive, San Diego 3, Calif.

ASTRONOMICAL Telescopes, binoculars, microscopes; Bought, sold, repaired. Books. Lists 10c. Rasmussen-Reece, Amsterdam, N. Y.

4" ACHROMATIC lenses, perfectly figured, each $95.00. James Bray, 860 Walnut Ave., Burlingame, Calif.

16 BABY CHICKS

BABY Chicks, Champion Mated, 25 varieties, 6 hybrids, licensed inspected, blood-tested. Rush postal, large colored book Free, low prices. Berry's Farm, Route 11, Clarinda, Iowa.

Save Up To 3c a chick. Get Colonial's early order cut prices on 200-336 egg pedigree sired Chicks. Purebreeds, crossbreeds, as hatched or sexed. Catalog Free. Colonial Poultry Farms, Box 704, Pleasant Hill, Mo.

SUPERIOR best chicks with 200 to 336 egg bloodlines. Leghorns, Rocks, Reds, Hampshires, Wyandottes, Orpingtons, Austrawhites and Legorcas, as hatched or sexed. Low prices save you $1 to $3 per 100. Old, reliable, established 1919. Big Free Catalog. Superior Hatchery, Windsor, Missouri.

43 DOGS, BIRDS, PETS, RABBITS

RAISE guaranteed Chinchilla rabbits. Greatest profits from gorgeous furs, delicious meat, valuable breeders. Experience unnecessary. Fascinating hobby. Year-round money-making business. Write world's largest breeder today. Willow Farm, R-16, Sellersville, Penna.

$250 MONTHLY, Raising Angora Rabbits. Particulars free. White's Rabbitry, Newark, Ohio.

$5,000 YEARLY possible raising Angora rabbits our Co-operative marketing plan. Iowa Angora Association, Cedar Rapids, Iowa.

RAISE rabbits. Market provided, breeding stock furnished on Production Pay Plan. Literature 25c with hutch plans $1. Hansen's Rabbit Institute, 1347 Miller Avenue, Salt Lake City 6, Utah.

YOU Can make real money raising Golden Hamsters, the new amazing tiny animal. Food costs less than 10c month per animal. Breeds in 16 days! Easily raised in basement, attic, garage, barn or shed. Write for convincing details. Hudson Hamstery, R.F.D. 1, Newfoundland, N. J.

RAISE Guinea Pigs. Make money at home. Big demand. Booklet free. Taylor, Box 426B, Hapeville, Georgia.

ANGORAS, giant Chinchillas — Heavy-producing prize winners. Literature free. Grinsteads, Edwardsville, Illinois.

SEE "Golden Hamsters" ad on page 63. Shows hamster picture.

GOLDEN Hamsters—Novel pets. Send $5.00 for pair ready to breed. Including two metal cages and instructions. Hathaway Hamstery, 609 Deerfield, Silver Spring, Md.

60 FROG RAISING

"FROG Raising." New book teaches how. Marborough, 1035 Marborough, Detroit 15, Michigan.

83 MILK GOATS

RAISE Dairy Goats. "All about goats and goat milk in big, illustrated monthly magazine. Sample copy 25c. Special Introductory year subscription only $1 (regular $2 a year). Booklet, "Primer for Goatkeepers", Free on request. Dairy Goat Journal, Dept. 868, Columbia, Mo."

116 REPTILE PRODUCTS

REPTILE list 5c; Biological supply Catalogue 10c; Chameleon 25c; Alligator $1.75. Quivira Specialties, Topeka 2, Kansas.

52 FARMS OTHER REAL ESTATE

FARMS, Ranches. All kinds, sizes. Choice of location, climate, production. Information on irrigation projects Columbia and Missouri River Basins. Resorts, summer homes. Milwaukee Railroad territory: Washington, Idaho, Montana, Dakotas, Wisconsin, Upper Michigan, Central Corn Belt. Free folders, price lists. L. H. Robbins, 613 Union Station, Chicago 6, Illinois.

STROUT'S Big Farm Catalog—Mailed Free. Describes over 2800 outstanding Bargains. Coast to Coast. Time-Money Saver. Write Today. Strout Realty, 255-ZB 4th Avenue, New York 10, N. Y., 20 W. 9th St., Kansas City 6, Mo., 453 S. Spring, Los Angeles 13, Calif.

'OZARK Lands for All purposes. Actual river frontages. 5 acres $90.00 and upwards. Free list and literature. Hubbard, 424J, Minnesota Ave., Kansas City 4, Kans.

GOOD FARMS—Ranches. Washington, Minnesota, Montana, Idaho, Oregon, North Dakota. Dependable crops, favorable climate. Write for literature, lists describing typical farm opportunities. Specify which state. J. W. Haw, 120 Northern Pacific Ry., St. Paul 1, Minn.

HOMESITES $450—convenient payments. California's finest garden section. On Morro Bay's scenic shores. Wonderful fishing, hunting, boating, bathing. Fertile soil, softest water, temperate climate, congenial community. Free literature. Richard Otto, 6560-Z, Hollywood Blvd., Hollywood 28, California.

CANADA—for literature and information re general farming, ranching and fruit lands, write H. R. Williams, Department of Immigration & Colonization, Canadian Pacific Railway, Vancouver, B. C.

10 ACRES good land $250.00, $10.00 down, $10.00 monthly. R. W. Stewart, Inverness, Florida.

FLORIDA — Hunting, Fishing, Fruit Growing, 5 Acres, $245.00, $10.00 Down, $10.00 a month. G. B. Potterfield, Route #1, Brooksville, Florida.

108 POULTRY AND SUPPLIES

RAISE turkeys the new way, write for free information explaining how to make up to $3000.00 in your own backyard, address National Turkey Institute, Dept. 57, Columbus, Kansas.

MONEY-Making Experimental Farm poultry raising helps only $1.00 for 24 months. Sixty months $2.00. Early start increases profits. Order now! Poultry Tribune, Dept. T, Mount Morris, Ill.

RAISE Fryers new easy way. One man home plant earns $500 monthly. Booklet free. Poultry Guild, 1046-B So. Olive, Los Angeles 15, Calif.

111 PROFITABLE OCCUPATIONS

ANNOUNCING home study course in commercial baking. Practical basic training. Good field for those with aptitude. Nearly depression proof. Send for Free booklet, "Opportunities in the Baking Industry." National Baking School, 1315 Michigan Ave., Dept. 1723, Chicago 5, Ill.

$40.00 WEEKLY. Made growing mushrooms. Fresh. Dried. Dominion Patent 331,583, free spawn. North American, 169Y Yonge, Toronto, Canada.

$5000. from half acre growing Ginseng, seed supplied. Crop bought. Particulars 10c. Associated Growers, 1169 Corydon Ave., Winnipeg, Canada.

INCREASE your earnings—Learn Neon Glass Blowing—Free Information. Public Educational Service, 493 Irving, Bridgeton, N. J.

EXTRA money? Free Details. Trable, 1018½ Elm Street, Dallas, Texas.

HYDROPONICS grow vegetables, plants without soil using cheap chemicals. Fascinating, profitable. Send 25 cents. Box 57, Bristol, Virginia.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

MUSHROOMS grown, boxes, barrels. Instructions 50c. Spawn $1.00. Gordons, 553 William, Winnipeg, Manitoba.

START lamp factory. Profitable, fascinating, easy to learn. Illustrated course teaches you. Complete instructions, wholesale catalog $1.00. Gearon Company, 640 5H North Oakley, Chicago.

YOUR own business painting flagpoles and smokestacks. Particulars free. Skyline Co., 1601-A, Uniontown, Pa.

$150 PROFIT in 4 days made by Floyd Brown, Iowa. You, too, make Big Money in your own profitable business with amazing Liquid Imitation Marble, Fibre-Tite Flooring and Flexible Molds. Full or spare time. Experience unnecessary. Work from your own home. Write for Free Catalog, full information today! Composition Products Co., Dept. 23, 5853 Delmar, St. Louis, Mo.

PROFITABLE business in making and building with interlocking blocks. Delaware Industries, Dept. 20, Muncie, Indiana.

POLISHERS make good money! Always needed! Learn professional techniques, easily, inexpensively! Free details. Joseph B. Kushner, Metal Finishing Consultant, Stroudsburg 33, Pennsylvania.

DETECTIVES Earn Big Money. Excellent opportunity. Detective Particulars free. Write, Wagoner, P-125 West 86th, N. Y.

DO it with Sea Shells. Attractive Jewelry, Novelties. Big profits, instruction. Supplies Wirts, 1429—56th Avenue, Oakland 3, Calif.

MAKE beautiful costume jewelry at home for large profits, hobby or therapy. Free illustrated wholesale catalogue of sea shell, metal and plastic parts contains detailed instructions. Florida Supply House, Bradenton, Florida.

900% PROFIT. Stamping key checks, dog tags, Social Security plates. Arrington's, LaGrange 7, Georgia.

ELECTROPLATING Has a thousand and one uses. Make good money in spare or full time. Warner Electroplaters permit you to easily plate chromium, gold, silver, nickel, copper, etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write today for free sample and literature. Warner Electric Co., Dept. PO-P2, 1512 Jarvis Avenue, Chicago 26, Ill.

NEWEST idea in finishes. Flok-Kraft Synthetic plush sprayed on all shapes, surfaces. Beautiful soft texture covers mended radios, furniture, figurines, lamps. Profitable, entertaining. Supplies, equipment, free instructions. Coast Industries, 1511 West Manchester, Los Angeles 44.

MAKE beautiful mirrors from ordinary window glass. No expensive equipment required. Details free. Tes-co, Box 189-SE, Wilkes Barre, Penna.

22 BOOKS, PERIODICALS, ETC.

WHAT Every Mason wants. We have Masonic books for Blue Lodge, Chapter, Commandery Scottish Rite and Shrine. Our rituals are used the world over. Send for our free catalog of books and rituals for Masons, Odd Fellows, Knights of Columbus, etc. Ezra A. Cook, Publisher, Inc., P.O. Box 796-RMY, Chicago 90, Ill.

EDUCATIONAL Books sold cheaply or rented for small fee. Books bought. Money-back guarantee. 4,000 Bargains. Catalog Free. (Courses Bought.) Lee Mountain, Pisgah, Alabama.

MAGAZINE, Bookmen, mail dealers. Increase your income. Sell new lawn book to home owners. Price $1.00; dealers fifty cents. Leslie Kerr, 3825-D Tenth Street, Washington 10, D. C.

BOOKFINDERS! (Scarce, out-of-print, unusual books.) Quickly supplied. Send wants. Clifton Company, Box 1377 PS, Beverly Hills, Calif.

BOOKS Found free! All Subjects. Send Wants! Jaher Book Service, 620-K East 178 Street, New York 57.

"ADULT bookalogues." 25c. Fifteen—$1.00! Free catalogs! Hirsch, Spring Valley 3, N. Y.

MAGAZINES-Business-vocational-diversion. Current single copies. All fields. Free price-list. Commercial Engraving Publishing Co., 34S North Ritter, Indianapolis 19.

96 PAGES—Gal snaps, cartoons, amusing situations 25c seller. Earn 300% profit. Samples 25c or $5.00 per hundred. Palace Distributors, 480-P Lexington Avenue, New York, N. Y.

1000 DIFFERENT Pocket Books. Catalog 5c. Gordon's 2613-B, Crenshaw, Los Angeles 16.

ADULT Books—Artist's pin-ups: Catalog sample 10c. Baker Service, Box 1840, Cleveland 6, Ohio.

BACK-Date Magazines, Books, Specific issues—years. Arkell's, Tarzana, Calif.

"FIX It Yourself"—home repair book. How to fix appliances, furniture, plumbing, etc. 256 pages, 163 pictures. $1.49. Popular Science, Dept. 28-C, 353 4th Avenue, New York 10, N. Y.

"RADIO For The Millions"—practical book. Complete instructions for building 78 radios, phonographs, other sets. 192 pages, 648 pictures. Regular Edition $1.49. Popular Science, Dept. 28-C, 353 4th Avenue, New York 10, N. Y.

HAVE you a "Love" problem? Confidential listing: "Lonely Hour Books" may have what you want. Send 25c (refunded with first order). Poets Corner Press, Box 152, Fort Lee, N. J.

PHYSIQUE Studies 150 different poses $1.00. Gene Jantzen, Bartelso, Illinois.

SEVERAL good Money Making magazines 10 cents. Jenkins Company, Atmore, Ala.

ADULT books—unusual, fascinating—five $1.00. Free Catalogue. Kogan, 1032-SL, New York 8.

1948 CATALOG, wholesale directory, 10c. Latshaw Sales, Sunnyside-C, Indianapolis 44, Ind.

HORSE racing books, systems. Free illustrated catalogue. Charles Hall, Sepulveda, Calif.

MEN Only. Fresh stuff in little Books. 10 for $1.00. DuLaw Novelties, Box #297, East Chicago, Indiana.

BACK issues magazines, reasonable. Reedmor, 240 East 9th, New York, N. Y.

BOOKS: Psychiatry, marriage, hypnosis. Free catalogue. Abbott-Dunhill, 752-F Northwest 66th, Miami 38, Florida.

COLLECTORS Photographs — Curios — Books—Lists dime. Jack's Shop, 591 12th Street, Oakland 7, Calif.

BRILLIANTLY — Colored Outdoor Pictures also adult books. Sell out list free. Lefferts, Box 48, Brooklyn 25, N. Y.

"CHAOS" (All America be Pearl Harbored) $1.00. World-Press, Columbia City, Ind.

81 MAGIC TRICKS, PUZZLES, ETC.

MAGICIANS', Gamblers' secrets exposed. Cards, Dice, Punchboards, Slot Machine. Catalog 10c. Book Co., Box 671, St. Louis 1, Mo.

WORLD'S largest professional magic shop, keeps you in touch with latest tricks. To receive mailings, send 35c for new catalog. Holden's, 220-P West 42nd St., N. Y.

BIG Magic Magazine, trick and price list—25c. Lloyd S. Jones, 4064—39th Avenue, Oakland 2, Calif.

500 PAGE catalog, 6,000 novelties, gadgets, timesavers, hobbies, fun-makers, etc. 10c. Johnson Smith, A-74, Detroit 7.

TRICKY Magic Matchbox. It turns around, it stands, it opens. Confuses, amuses everyone, easy to do. Free To You if you send 25c for Big Illustrated Catalog of 425 Magic Tricks. Magician, 2463-D Kensington Ave., Phila. 25, Pa.

200 ELECTRIC Stunts, 110 volts, $1. Cutting Sons, Campbell 3, Calif.

FREE! large catalog of magical apparatus if you remit 25c for "Magic Is Fun" magazine. Robbins Co., 152-F West 42nd Street, New York.

COIN & Ring trick! Mystifies, amuses! 35c with descriptive list of fun and magical items. Free gift for promptness. Powell's, P. O. Box 2155 A, Potomac Station, Alexandria, Virginia.

"MAGICIAN'S Pin, Ghost Illusion, Houdini Escapes. Giant Catalog. Everything complete 35c. Magic Wand-M, 9W, Colorado, Pasadena, Calif."

HYPNOTISM! 25 Lesson Course, $1.00. Monarch, 38-S Jefferson, Auburn, New York.

"VENTRILLO", Professional voicethrowing instrument and Mammoth catalog 25c. POB-971, Philadelphia.

DOLLAR magic set free with Gigantic catalog 25c. Magex, 4462 Germantown, Philadelphia.

SNEEZING, Itching Powder, eighteen other tricks free with Joker's catalog 25c. 2404-N 15th, Philadelphia.

HYPNOTIZE instantly! Fascinating, astounding results. Course $2.00. Guaranteed. Hypnolab, 2815 West 20th Street, Brooklyn, N. Y.

BE a Magician. Large professional magic catalog of latest tricks, 25c. Ireland, F-109 North Dearborn, Chicago.

LEARN magic, Ventriloquism, Mind-reading. Write for particulars. Quackenbuch, Big Flats, N. Y.

MASTER cigarette vanisher will fool even your wife! Penny that nails to floors. 25c (Wholesale). Catalog 10c. Scheetz's, Sellersville, Penna.

VANISHING Quarter trick and catalog 25c. Sterling Magic Co., Royal Oak, Mich.

HYPNOTIZE immediately! World's largest dealer offers jumbo hypnotism catalog 25c. Nelmar, 2820 No. Lawndale, Chicago.

MAGICIANS' Headquarters — 400-Page Professional Catalogue, pocket, parlor, stage tricks. World's finest magic. Send $1.00 for Catalogue (refunded first $5.00 order). Kanter's, S-1311 Walnut, Philadelphia 7, Penna.

WHOLESALE Samples 40 Tricks, Jokes $1.00. "Funshop", 12-PS Churchlane, Philadelphia.

63 GAMES, ENTERTAINMENT

HOME Model Slot Machines and Coin Operated Games. Write for catalog. Webb Distributing Co., Dept. P4, 6 South Kedzie Ave., Chicago 12, Ill.

FLIP any coin heads or tails at will! 25c. Arro, Box 961-E, Bridgeport 1, Conn.

36 COIN COLLECTING

GET profit and pleasure in collecting old coins. Send 10c for 56 page illustrated coin catalog. You'll be delighted with it. Send for it now. B. Max Mehl, 374 Mehl Bldg., Ft. Worth, Texas. Largest rare coin establishment in U.S. Established 48 years.

FREE! Foreign coin, banknote and Coin Collectors' Illustrated Catalog to approval service applicants. Send 3c postage. Tatham Coin Co., Springfield-D50, Mass.

$2.00 TO $200 each paid for hundreds of Old or Odd Coins. Indian-Lincoln-Foreign Wanted. Keep all until posted. Send 20 Cents for illustrated Coin Value Book, 4 x 6. Guaranteed Prices. 40 years in business. Coin Exchange (1), Le Roy, N. Y.

OLD Money Wanted. Do you know that coin collectors pay up to $100.00 for certain U. S. cents? And high premiums for all rare coins? We buy all kinds. Send 4c for Large Coin Folder. May mean much profit to you. Numismatic Co., Dept. 30, Fort Worth, Texas.

UNUSUAL worldwide collection twelve different foreign coins and bills only 25c. Webb, Box 473, San Bruno, Calif.

RARE 1922D Lincoln cent 15c. Reynolds, 118-B Mathews, Flint 3, Michigan.

COMMEMORATIVE $½ — Columbus, Washington, Cleveland, Stone Mountain, $1.50 en. Illustrated Catalogue 25c. Norman Schultz, Salt Lake 9, Utah.

U.S. coins lowest prices. Send stamp for lists. Hutchinson, 3463 I Street, Philadelphia 34, Penna.

INTRODUCTORY offer—U.S. Rare Coin Value Guide 30c—send postal note to Hobby Helpers, Dept. P2, Box 665, Washington 4, D. C.

CLOSING out:—435 antique firearms;—35,000 coins, relics, cartridges, swords, flintlocks, carbines, antiques, minerals. Illustrated Catalog 25c. Heike, Wenona 31, Ill.

WHITMAN Folders—Any four $1.00. Twelve Wooden nickels $1.00. Large retail catalogue 15c. Bebee Coin Company, 1180 East 63rd, Chicago 37, Illinois.

Copyrighted material

50.000 COINS, medals, papermoney. Illustrated lists free. Nagy's, 8-M South 18th, Philadelphia 3, Pa.

50 WORLD coins $1.00. Harry Elsholz, Box 9014, Pittsburgh 24, Penna.

100 MIXED foreign coins $3.00. Del Monte, 725 West 172, N. Y. 32.

40 MIXED Indian Pennies $1.00. 50 different foreign coins $2.00. Internat'l, 656 West 171, N. Y. 32.

SPECIAL offer 80 different foreign coins —ancient coin 2.000 years old, 5 Indian cents, U.S. eagle cent, 2 cents piece and 5 foreign paper bills. The lot $5.00. Pappas, 356 Wadsworth Ave., New York 33, N. Y.

96 OLD STAMPS WANTED

I WILL pay $100.00 each for 1924 1c green Franklin stamps, rotary perforated eleven (up to $1.000.00 each unused). Send 10c for large illustrated folders showing Amazing prices paid for old stamps, coins, and collections. Vernon Baker, PS-82, Elyria, Ohio.

127 STAMP COLLECTING

DEALER'S Wholesale Catalog. Postage 3c. Franksco, 5031 Queensbury, Baltimore, Maryland.

300 DIFFERENT given free with approvals. Postage 3c. Windsor Stamps, 1435 E. 67th Place, Chicago 37.

UNITED STATES approvals complete coverage fine quality, attractive prices. Seminole Stamps, Box 1138-S, Coral Gables, Florida.

ZOWIE-E-E! A Barrel of Fun for only a Dime! 500 United States Stamps—Absolutely unpicked and unsorted, just as received from church missions. Many varieties, including large commemoratives, airmails, high denominations up to $5.00! Stampdom's biggest package of fun, and you might find something really valuable!! Price only 10c to serious approval service applicants. Money back if not delighted. Illustrated bargain lists with each order. Mystic Stamp Co., Dept. 55, Camden, New York.

START your own stamp business. Write for free circular. Donald Shepard, Box 5139, Chicago 80.

"200 DIFFERENT stamps—cataloging up to 50c each—only 3c to approval applicants! Littleton Stamps, Littleton 47, N. H."

"WOW!! $10.00 Worth Of Fun—Only 10c! What a treasure hunt! Big package 500 Foreign Stamps from foreign missions, other sources. Includes Stamps from Africa, South America, Free French, Cape Juby, Palestine, etc. Includes airmails, commemoratives and stamps worth up to 50c. This offer sent for 10c to Approval Applicants only. Jamestown Stamp Co., Dept. 5, Jamestown, N. Y.

128-PAGE United States Catalog. 1000 illustrations. 10c. Harris & Co., 202 Transit Bldg., Boston.

United States Stamps on approval. Bargain prices. Metropolitan, 140-A Nassau, New York City 7.

NICARAGUA "Tin Pan Alley" Diamond, Ecuador showing George Washington, and American Flag in natural colors, Fezzan, Trieste, "American Army" stamp First U.S. Commemorative, $100.00 Shanghai, Corsica, Anzac, Antique, others all 5c approvals. Capital Stamp Co., Dept. 10, Little Rock, Ark.

50 DIFFERENT United States 10c Price list free. Seidenberg, Cassopolis, Mich.

FREE! Triangle Roosevelt, Vatican, Ethiopia, Hitler Heads, with Approvals. Florida Stamp Company, Box 807, Miami, Florida.

FREE. Stupendous Amazing Mammoth Collector's complete outfit, including large Scott Album, all needed accessories, plus over 1050 selected all different stamps, including rare high values, airmails, triangles, countless beauties; total value over $25.00 given absolutely free to approval applicants becoming customer. Thrifty Stamp Service, Box 132, Los Angeles 53, California.

$10.000 USED Stamp Free a real stamp bargain. The new $10.000 Chinese stamp sent absolutely free with our packet of 100 different stamps, only 10c. Allison Stamp Co., 49 W. 44, N. Y. 18.

EXCHANGE Stamps Universe. Particulars free. "Exchangers," Bry 118 (Seine) France.

200 DIFFERENT stamps, 6c, to approval service applicants. Tatham Stamp Company, Springfield 50, Mass.

FREE—Famous Americans set, plus Flag set, plus the National Parks set, plus the Presidential set to the $5. A total of 90 stamps absolutely free to customers for our unsurpassed United States or Foreign selection. Send 3c postage for 15 of the above mentioned stamps and full particulars. Triboro Stamp Company, 145 Nassau Street, Dept. 203, New York.

BIG premium, free stamps every month, news bulletins, low priced approvals are yours, write today. Ernest Moumblow, 740 Hegney, Bronx 56, New York City.

15 DIFFERENT U. S. over 40 years old. 10c special to applicants for our bargain U. S. approvals. Will Portney, 1806 East 22 St., Brooklyn 29, N. Y.

WORLD'S Largest Stamp (7½ x 14 inches). A real curiosity! Retails for 50c, only 3c to approval applicants. Tatham Stamp Co., Springfield 50, Mass.

200 DIFFERENT, including Roosevelt triangle, 5c to approval applicants. S. Avalon Stamp Co., Springfield, Mass.

FREE! Negro Triangle; Turks Islands "Cactus"; Dakar; Guinea; Palestine; "Fairy Tale", Pirate Chart, Map, Ship, Sea Lion and Snake stamps; French, British, Portuguese Colonies, etc., Free for 3c postage. Approvals. Potomac Stampco, Washington 10, D. C.

POSITIVELY Greatest free offer—Latest Scott's International $6.00 stamp album—covering entire world, contains 36.000 illustrated descriptive spaces; Scott's 1948 Standard $6.00 catalogues "Philately's Encyclopedia"—absolutely free to applicants for foreign approvals becoming customers. Bargain Stamp Service, Santa Ana, California.

FREE: 25 different stamps—Russia, Vatican, Manchukuo, etc., sent approval applicants enclosing 3c postage. Standard, Box 1616, Miami Beach, Florida.

25 DIFFERENT India—3c with approvals. Premiums with purchases. Brandwein Stamp Co., Box 92-P, Bayonne, N. J.

FREE — Canadian Sets Royal Visit, George VI, George V, Coronation, Jubilee, others, to approval applicants. Ensign, Box 118-P, So. Orange, N. J.

GIBRALTAR Packet Free—Nice collection Gibraltar—New Zealand Centennial—British Uganda—French Colonials—Early British Colonial—West Indies—South American—War stamps plus Philatopic Monthly Magazine. All for 5c postage. Empire Stamp Co., Dept. P. R. Toronto 5, Can.

CHOICE of 35c Worth of stamps from our first U. S. selection Free to applicants enclosing 3c postage. Large selection to choose from. Act Now!!! S. C. Engel & Co., 38 Park Row, N. Y.

FREE!!! Mint British Colonies from Solomon Islands, Caymans, Grenada, Dominica, Turks Caicos. Absolutely free to new approval applicants. Viking, 130-P, Clinton St., Brooklyn, N. Y.

FREE—The Stamp Finder. Big new edition—32 pages profusely illustrated. Identifies all difficult stamps immediately. Given free with 319 different stamps from Vatican City, Palestine, Cyprus, San Marino, etc. All sent to approval applicants for only 10c. Price lists. Garcelon Stamp Company, Box 818, Calais, Maine.

50 DIFFERENT Norway only 10c to approval applicants. Floyd Frederick, 513½ Green Street, Lancaster, Penna.

COSTA Rica, Roosevelt, Romania, Philharmonic Commemoratives (5), 3c to approval applicants. Middleton Stamp Company, 78-14 Woodside Avenue, Elmhurst, L. I., N. Y.

BRITISH, Spanish, French Colonies, Vatican, Hitler heads, and airmail packet, free with approvals. Pan-American Stampco, Box 145, New York 33, N. Y.

UNITED STATES Price list. Send Postage. State Stamp Corp., 1225 Park Bldg., Pittsburgh 22, Penna.

FREE U. S. Price list postage 3c. M. Hanna, 335 5th Ave., Pittsburgh 22, Pa.

Mint Nicaragua Will Rogers Set 10c to applicants requesting approvals. Michalicka, 101 Third Ave., Newark, N. J.

"CONFEDERATE-States" twelve different unused 10c approval applicants only. "Stamps", Box Eighty-Seven, Albany 1, N.Y.

FREE. Fascinating Airmail Collection, including obsolete Liberian issue with approvals. 3c postage please. Raymax, 123-X William St., N.Y.C. 7.

3 AFGHANISTAN 10c big list 300 other dime packets. Ewing-Stamps, 109 N. Dearborn, Chicago 2.

25 DIFFERENT Stamps 10c. Tunis And Carpenter, Wakeman Ave., Newark 4, N. J.

U. S. 797 SPA Sheet only 5c to applicants for U. S. approvals. M. Haycock, 333—86th St., Brooklyn, N. Y.

STAMP Magazine! Copy Free! "Stamp Post," Station A, Pasadena 3, Calif.

WONDERFUL Dazzling low-priced beginners approvals! Discounts Galore! Atlas, 3210 Republic, Racine, Wisc.

GOOD U. S. approvals. Rock bottom prices. Panthers Prompt Stamp Service, Dorchester 24, Mass.

WORLDWIDE Different: 200-25c; 500-60c; 1000-$1.50; 2000-$4.25. Beacon Sales, Maynard 3, Mass.

PENNY Approvals that satisfy. Neil Gronberg, Box 5441S, Philadelphia 43, Pa.

"$1.00, $2.00, $5.00 U.S., Roosevelt, Hitler, Airmails, free with approvals. Tamiami Stamps, Box 2188, Miami 13, Fla."

LIBERIAN triangulars, 10c with approvals. Vargo Stamps, 6044 South Fairfield, Chicago 29, Illinois.

MINT sheets U.S. exclusively. Free list. Kenda, 82 New Jersey Ave., Brooklyn 7, N. Y.

YIPPEE! Free 25c worth from U.S. beginners selection. Village Stamps, 90-39 214th St., Queens Village 8, N. Y.

OLD scarce U. S. Seconds on approval. Slightly defective, bargain prices. Hearnfeld, 551 Clinton, Newark 8, N. J.

5 SETS—Five countries—Triangle, Orchid, Maps, Animals. With approvals 5c. Arthur Wirth, Norwichtown 2, Conn.

HISTORICAL Collection!CavalryCharge! (Bulgaria)—Flaming Sword! (Ireland)—Big She-Wolf! (Italy)—Fort! (Dominican Republic)—Field Marshal! (New Zealand)—Pitcairn Mutiny Island!—Commemoratives! Pictorials! Only 3c. Approvals. Star Stamp Company, Dept. 1, 11 East 15 Street, Jamestown, N. Y.

WONDERFUL! Roosevelt Triangle, Negri Sembilan, Perak, Kedah, St. Vincent, set Nigeria, Italian Africa and numerous other. Everything 10c with approvals. Phipps Stamp Mart, 10993 Wellworth Ave., Los Angeles 24, Calif.

FINE U.S. foreign approvals. Rossom, 218 West 59th St., Chicago 21, Ill.

FREE—Commemoratives, airmails, pictorials. Approvals. Wisehart, 330 Second, Frankfort, Ohio.

TRIANGLES! Diamonds! Midgets! Roosevelts! Hitlers! U.S. $2.00, $5.00! Sensational packet. Stamp magazine. Everything 6c with approvals. Thrifty Stamps, Silver Spring, Maryland.

50 DIFFERENT Belgium stamps and our price list, one silver dime. Stampsales, Box 1649F, Oakland 4, California.

VERY fine medium priced mint sets 1940-46 for Scott's International Album. Wlaschim's, 234 Columbus Ave., N. Y. 23.

FLAG Stamp Free With U.S. Approvals. E. Wenigman, 929 Oakdale, Chicago.

CANADA Peace set 10c with attractive approvals. Rheume, 8949 Routhier, Montreal, Canada.

LOOK—1000 World Wide 63c. Pacific, P.O. Box 5704, Los Angeles, Cal.

Copyrighted material

ROGUES Gallery Packet. Hitler-Mussolini. 30 others. 3c. Premium. Hartland 6. Me.

GIANT bicoloured royal visits. Malta pictorials. gorgeous Guianas Goose Airmail. Scandinavian packet and illustrated stamp publication 10 cents with approvals. Crown Stamps. Box 331. Toronto. Canada.

"SEND for our better U.S. approvals today. Box 488-A. Minneapolis."

FREE 3 foreign mint blox. approvals. Robert Whealey. 13 Pershing Blvd., Baldwin. N. Y.

FREE: Twenty different foreign commemorative stamps to new approval applicants. Modern Stamp Service. 644A East 233rd St.. N. Y.

MINIATURE stamp album. 20 stamps from 20 foreign countries including scarce triangle. Roosevelts. packet of stamp hinges. and millimeter scale. All for 10c to serious approval applicants. Detroit Postage Stamp Co.. Dept. S.. Detroit 23. Mich.

CIPEX Sheet. commemorating 100th Anniversary 1847 issue with 30 different U.S. containing early issues. commemorative. airmail. envelope. revenue. Catalog value exceeds 65c—all for 10c to approval applicants only. Curhan Stamp. Dept. P. Gloucester. Mass.

SELECTED penny approvals. Henry Jay Service. 15 Park Row. New York 10. N. Y.

TRIANGLES included in packet 50 different to new approval applicants for 5 cents. Harford Stamps. Box 6 S. Parkville 14. Md.

MINT Hitler heads. 18c Scotts #506-523 for only 25c. Blocks of four $1.00. Reich Stamp Co.. 4647 Kenmore. Chicago 40. Ill.. Dept. S16.

NEW Brazilian triangle. Free with approvals. Bill's Stamps. Box 5222. Cleveland. Ohio.

GIVEN free;—Roosevelt. Churchill. Hitler. Mussolini. Illustrated pricelists. Imperial Company. Box 1491. Tampa. Florida.

FINE Approvals. Fast. personal service. What countries do you prefer? I'll send their stamps. Milton Skinner. 438 Locust. Long Beach 12. Calif.

WHOOPIE! Wowie! 25c worth of U. S. stamps free! No obligations! Write: M & N Co., 742 Sheffield Ave., Brooklyn 7, N. Y.

"GOYA NUDE" set. cataloguing $1.30. complete 35c. Approvals. Royal Stamp Co.. Tamaqua 2. Penna.

DISTINCTIVE Approvals. desirable foreign stamps. reasonably priced. Several interesting features included. Send 3c stamp for particulars. Strecker. 1800C South 58th Street. Philadelphia 43. Penna.

FIVE valuable U.S. covers. Old issues. etc. 25c. Sea Horse. 1311 Lincoln Place. Brooklyn 13. N. Y.

AMAZINGLY beautiful collection of stamps depicting ships. trains. birds. locomotives. beasts. bridges. as people in foreign lands picture them. Only 3c with our superb approvals. Universal Stamps. Hollis 7. N. Y.

70 HOBBIES. COLLECTIONS

INVENTING can be an interesting and profitable hobby. Write for complete particulars. Institute of American Inventors. Dept. 30-E. 2926-Eye St.. N. W.. Washington 6. D. C.

500 PAGE catalog. 6.000 novelties. gadgets. timesavers. hobbies. fun-makers. etc. 5c. Johnson Smith. A-75. Detroit 7.

24 DIFFERENT pictorial comic buttons $1.00. Theron Fox. 1024-A Carolyn Avenue. San Jose 10. Calif.

UNUSED Match Book Covers. 100 all different $1.00. Free catalog. Charles Edelman. 1311 P East 84. Cleveland 3. Ohio.

PHYSIQUE Studies 150 different poses $1.00. Gene Jantzen. Bartelso. Illinois.

10 ANCIENT Indian arrowheads $1.00. List free. Lear's. Kirby. Arkansas.

ULTRAVIOLET hobby bulletin free. Instructive. fascinating. Mission Mart. 818 Fort Stockton Drive. San Diego 3. Calif.

8 ANTIQUES, RELICS, INDIAN GOODS

CLOSING out:—435 antique Firearms:—35.000 coins. relics. cartridges. swords. flintlocks. carbines. antiques. Minerals. Illustrated Catalog 25c—Heike. Wenona 32. Illinois.

85 MINERALS & PRECIOUS STONES

MINERAL Identification Simplified—Valuable book identifies 2000 minerals. $3.50. Wetzel Publishing S.. Los Angeles 13. Calif.

"LUCKY" Lodestones. highly magnetic natural magnets. Perform many extremely interesting experiments. Two large specimens only 50c postpaid. National Scientific Company. 2204 W. North Ave.. Chicago 47. Ill.

GEMS. precious and semi-precious. all genuine from world wide sources. Deal direct. no overhead. save money. Catalog 10c. Hill Co.. Route 7-K. Salem. Oregon.

MINERAL specimens. rough gems. Sapphire 10c. List free. Mission Mineral Mart. 818 Fort Stockton Drive. San Diego 3. Calif.

26 CAMERAS, PHOTO SUPPLIES

ANSCO Color 35mm film Tungsten. 20 exposure cartridges. Includes Processing By Ansco. Fully guaranteed. Regular price $2.82. Our price $1.35 each—12 for $15.50. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

CASH! Spot cash for cameras. lenses. binoculars. movie and still equipment. Send full description for prompt cash offer. Over 36 years of dependability. Bass Camera Co.. Dept SP. 179 W. Madison St.. Chicago 2

KODAK 35mm Plus X. Original factory tropical packing. frame numbered 36 exposure cartridges. Fully guaranteed. Regular price $1.10. Our special price 50c each—12 for $5.50. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

BASS Says: Trade Cameras? For 36 years Finest equipment available. Always Satisfaction Guaranteed Or Your Money Back! Bass buy 'em. trades 'em. Bass Camera Co.. Dept. SP. 179 W. Madison St.. Chicago 2.

PICTURES never before possible! 35mm Tri-X Film. Weston speed 200 daylight. 160 Tungsten. Guaranteed. 400' rolls. $6.75 postpaid. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

OIL coloring photographs can be a fascinating hobby or profitable sideline for those with artistic talent. Learn at home. Easy simplified method. Send for free booklet. National Photo Coloring School. 1315 Michigan. Dept. 1742. Chicago 5. Ill.

8mm KODAK Super XX Kodak Reversible. includes Kodak Processing. 100' rolls. suitable for 16mm cameras or Bolex H8. Short Dated but fully guaranteed. $4.95 each. $50.00 per dozen. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

FREE 2x2 Color Slide and Fine Grain Negative! Send self addressed stamped envelope for samples and catalog. Slidecraft. 5855-B Hollywood Blvd.. Hollywood 28. Calif.

RUBBER gloves. impermeable. acid resistant. Save your hands. Safe for all solutions. Brand new. Worth much more. Special price $1.69 per pair postpaid. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

ABC. 563 W. 181. N. Y. C. 33. Sells. buys. exchanges German Cameras.

KODABROMIDE Enlarging Paper. 4¼ x 825 feet rolls. enough for almost 2.000 4 x 5 enlargements. Single weight. Actual tests prove its worth. Fully guaranteed. Reduces printing costs to a fraction of a cent apiece. Value over $30.00 . . . Our Price $2.25 postpaid in U.S.A. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

ARTIST'S Models: 15—$1. Sample 25c. Sparton Sales. Box 2100. Cleveland 8. Ohio.

200 POWER telephoto camera easily made. Trifling cost. Free details. Suffolk Science Service. Manorville. N. Y.

35mm FILM. 100' rolls. DePont Superior #2. from surplus outdated but guaranteed. Load your own cartridges for less than 10c each! $.98 each roll. Delta Photo Supply. 690-S Third Avenue. New York 17. N. Y.

HAVE you a camera? Improve your hobby of photography and learn how to make better pictures. Write today for our latest book catalog and sample copy of American Photography. containing articles and pictures by the world's foremost writers and photographers. Camera House 607 353 Newbury St.. Boston 15. Mass.

ROSE parade 24 colorslides $8.00. Longstreet. Box 3003F Hollywood 28. Calif.

ENLARGER? Build your own cheap. we show you how. Complete plans $1.00. Somerset Specialties. 10514 Somerset. Detroit 24. Mich.

NEW Plastic print washer does swell job. Agitates. separates. washes. Only $2.00. order now. B. C. Hamilton. P. O. Box 618. Brookline 48. Mass.

CAMERA'S-Enlarger's — Movie Film — Big Free Catalog. Cavalier Camera. 1822 Center. Pittsburgh 19. Penna.

102 PHOTO FINISHING

THREE prints each 8 exposure roll 40c. Two each 35c. One each 25c. Reprints 3c. Fred A. Eastman. Bode. Iowa.

FINEST quality. Fastest service guaranteed. Roll developed and 16 Velox prints. 25c. Reprints 2c. 100 $1.50. Dick's Photos. Louisville. Ky.

ROLL developed. 8 prints and two enlargements 25c. Trial offer. Young Photo Service. 406-C. Albany 2. N. Y.

8 BEAUTIFUL Double Size pictures and roll developed 30c. 8 hour service. Free Mailers. Pacific Photo Service. Box 666. San Francisco. Calif.

50 VELOX reprints. $1. Suburban Studio. 1410-S Bond. Rockford. Ill.

POSTCARD size enlargements 5c. 5"x7". 2 for 25c. Kobylak. 50 Downs. Binghamton 6. N. Y.

ENLARGEMENTS! Snap-shots enlarged 5"x7". colored. placed in leatherette frames $1.98. 8"x10" $2.49. Ecsery. 237 E. 85 St.. N. Y. C. 28.

ENLARGEMENTS 5x7 15c. 8x10 25c. Glossy or dull. Gorgeously oil colored 50c. Rolls developed and printed 25c. L & R. P. O. Box 1476. Milwaukee. Wisconsin.

COMPLETE Photographic Service—Lowest Prices. We do Color Work—Free Mailers—Speedy Service. Atlas Photo. Box 151. Holly Springs. Miss.

90 MOTION PICTURES, SOUND EQUIPMENT

BEAUTIFUL Kodachrome Slide and Lists 25c. Slide Supply Service. 3111 West Tuscarawas. Canton. Ohio.

RENT 16mm. sound films 50c reel. Large selection; free catalog. U. C. Film Service. 128 Chestnut Street. Roselle Park. N. J.

GUARANTEED Fresh anti-halo outdoor movie film! Weston 16! Daylight loading! Processing free! Three spools double 8mm $4.50! 100 ft. 16mm spool $4.50! Postpaid! Catalog. Eso-S. 828-A West 39th. Kansas City 2. Mo.

8—16mm. SILENT—sound art films. International. 2120 Strauss. Brooklyn. N. Y.

LEARN movie projection. management. Free Catalog. Theatre School. Elmira. N.Y.

8-16MM. Silent-sound films. Complete rental library. All latest subjects. Free catalogue. (sample film 10c). Garden Film. 317 West 50th. New York 19.

MOVIE Film Processing—Finest automatic machine processing. 8mm. 16mm. 48 hour service. Also duplicating. editing. titling. other lab services. Send for list of prices. Fotoshop. Inc.. Room 113. 18 E. 42nd St.. New York City.

MOVIE Film At Tremendous Savings! Kodak Super X. Gov't stock. Tested—Guaranteed! 16mm 100 ft. $2.95; 50 ft. Magazine $2.50; Double 8mm 25 ft. $1.65. Super XX. 50c add'l. each roll. Free processing. Fast service. Photo-Surplus Sales. Box K-8. 12 Duane St.. New York City.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

MOVIE Cameras! New Lektro Junior 16mm electric, magazine-load F3.5 anastigmat lens, battery, cord. Complete. Ready-To-Operate only $59.50. Money back guarantee! Free literature. Panchromatic magazine film for this camera $2.50. New $32.50. Used $19.50. Other Panchromatic film—25 Ft. double 8mm $1.65; 100 ft. 16mm, $2.95; includes processing. Fotoshop, Room 88, 18 E. 42nd St., New York City.

"MISS AMERICA, 1947" 8mm., 50 ft., $2.00. 16mm., 100 ft., $4.00. Catalog including miniature reproduced scenes from 71 exciting subjects. 25c. World In Color Productions, Elmira, N. Y.

FAST films 8mm $1.45, write for specials. M-K Photo, 451 Continental, Detroit 14, Michigan.

ART Films: 50' 8mm, $2.75; 100' 16mm, $6.00; 100' 16mm sound, $7.50. Catalog Free. 16mm Viewer with 150 Art Figure Poses, $2.00 postpaid. Bruno 2¼x3¼ Art Negatives, 6 for $3.00 postpaid. Beautiful 35mm Color Art Slides, 10 for $3.50 postpaid. Seconds, 25 for $3.95 postpaid. Fresh Ansco 20 exposure 35mm Color Film, 3 rolls for $4.50, plus 15c postage. Gamerman's, 3808-C Eastern Avenue, Baltimore 24, Md.

ART movies 8-16mm. Send dime for list and strip. Glamour Films, Box 1844, Bridgeport, Conn.

WE Buy, Sell, Rent, Exchange Home Movies. Details for dime. Midland, Box 429, Oak Park 3, Ill.

SEND 10c for projector, camera, film, etc., catalogue. Sterling's, 679 Northampton, Easton, Pennsylvania.

35mm SILENT sound films supplies. Bedner 5300 So. Talman, Chicago.

YOU develop it. Get a 33 ft. developing rack, safe light, all chemicals, tray and instructions for $5.85. Fully guaranteed. Free circulars and film samples. Fromader Genera, Davenport 5, Iowa.

UNRETOUCHED art photos. For artists—photographers. Set eight photos $1. 4 sets $3. Confidential list photos, slides, 8mm—16mm art film, included with first order. Baker Service, Box 1840, Cleveland 6, Ohio.

HOLLYWOOD films. Color sample, $1.00 (refunded). Catalogs 10c (refunded). Stone, Lunenburg 10, Mass.

"THE World's Greatest Passion Play". All sizes. Rent or Purchase. Write Hemenway Film, 33 Z Melrose St., Boston 16, Mass.

EXCLUSIVE Home Movies Select Films. Write for Free List. Home Pix, 1674 Broadway, New York 19, N. Y.

ART model films 16mm rentals exclusively, adults list. Enclose stamp. Revere Films, Box 1051, Detroit 31, Mich.

UTILITEE Film Adapters use small color film in large cameras. At dealers or 655 North Broadway, Los Angeles 12, Calif.

SAVE $30.00 yearly. Send stamp for details. Bonnie's Film Club, 422 Haven Avenue, Hamilton, Ohio.

8MM CINEX movie projectors. New. Economical quality projection. Blower, framer, 100—150W lamps. $22.50. Write Becco, Box 675, Charleston, S. C.

IMMEDIATE delivery of 16mm Sound projectors. Large stock of Castle, Official, Nu-Art and Pictorial films. Soundies Comedies. 16mm Ansco color film. Used 8mm, 16mm Sound. List Titlers, Splicers, Editors, Rewinders. (Home Movies, 41 South Fourth Street, Allentown, Penna.)

DISTRIBUTORS Wanted. Make big money selling our new sensational films. Send for sample and free wholesale price list 16mm, sound, $10.00; 16mm, silent $7.50; 8mm, $2.50. Standard Pictures Corp., Universal City, Calif., Dept. B.

PROCESS your own movie film. Literature. Duro Products, 1519 Eggert, Eggertsville 21, N. Y.

BARGAINS in used 16mm sound films. Complete subjects for as little as $2.95 per reel. Big list for Stamp. Blackhawk Films, Davenport, Iowa.

ART Studies for artists—photographers. 4 x 5 unretouched. Eight photos $1.00. 4 sets $3.00. Catalog movies, slides, photographic supplies & equipment sent with first order. Pic-Tome Distributors, 912 Park Bldg., Cleveland 14, Ohio.

MAGAZINE 16mm 50' E.K. Super X panchromatic. Guaranteed. Processing included $1.99 postpaid. Circulars Free. Fischer Photo, 1729 N. Mobile, Chicago 39, Illinois.

FREE 1948 Movie catalog; samples 10c. Bargain prices. Goodwill Company, Jackson, Tennessee.

BARGAINS! Free films, equipment catalog! Towers, 935 North 40th, Philadelphia 4.

SPECIAL! Free Subscription Offer! Amateur Screen Photography, 3021B Narragansett, Chicago, 34.

92 MUSIC, MUSICAL INSTRUMENTS

PLAY piano by ear. A "sound" system. Booklet free. Joe Boucher, Box 12S, Ottawa, Canada.

BE Independent, tune pianos, music unnecessary. Practical Piano Tuning shows you how $2.00 Postpaid. Chord-Slide Co., Dept. PS, 3122 Lawrence Drive, Corpus Christi, Texas.

POEMS set to music. Experienced composer. Free folder. Moquin, 5333A La Cresta Ct., Hollywood.

SWISS Musical Units $3.25 musical albums, boxes, Novelties of Distinction, 131 West 42nd, New York 18.

PIANO: Beginners play popular music at sight. Just dial any song with Dial-A Chord. Revolutionary self-teaching method. $7.00. Nelson Studios, 9304 Edmunds, 102, Cleveland 6, Ohio.

MUSICAL movements, $3.00. Free photo. Pevar's, 4218 Viola, Philadelphia 4, Pa.

122 SONG WRITERS

POEMS Wanted to be set to music. Free examination. Send poems. McNeil, Master of Music, 510-PS, S. Alexandria, Los Angeles, California.

SONGWRITERS. Songs Published Monthly. Advance Royalty. Send your songs or poems today for our exciting offer. Hollywood Tunesmiths, Dept. 10F-C, 1537 N. Vine, Hollywood 28, Calif.

"SONGWRITERS: Send Poems for Free Examination and Outstanding offer. United Music, 116, Salem, Indiana."

SEND your songs, song poems. Hollywood composers write melody Without Charge. Lead Sheets, Records furnished. Send song material today. Free examination. Get details. Cinema Song Company, Dept. B-54, Beverly Hills, California.

SONGWRITERS—Protect your songs. Get the facts first. Free booklet, attractive offer. Song Service, 331-J West 46th, N. Y.

POEMS wanted for musical setting. Send Poem for immediate consideration. Hamann Service, 626 Manhattan Bldg., Milwaukee, Wisc.

POEMS Wanted For Musical Setting. Send poem for free examination. Five Star Music Masters, 646 Beacon Bldg., Boston.

LOUIS Terry's Tune Service 709½ N. Broadway, Oklahoma City, Okla. References. Write for Free booklet.

112 RADIOS, SUPPLIES & EQUIPMENT

MAKE Simple, Tubeless, Batteryless, Distance-Getting Crystal Radios. Crystal and illustrated instructions 25c postpaid. Allen, 427-S, Clinton, Mo.

U.S. Signal Corps Featherweight Earphones $1.00. Radio Service men and experimenters send stamp for our giant radio catalogue. Save dollars. United Radio Co., (100-V) Newark 1, N. J.

RADIO & Television Catalog—Free! Money saving prices on Radios, Hard-to-get Parts, Record Changers, Wire and Disc Recorders, Amplifier Systems, Tubes, Books, Amateur and Test Equipment. Write today! Radionic Equipment Co., Dept. 1511, 170 Nassau Street, New York 7, N. Y.

ELECTRONIC Photo Tube Kit complete with detailed instructions. Assemble automatic door openers, counters, alarms, scientific experiments, for home and business. $9.95 prepaid check, money order, COD. Gelbrook Products, Dept. 22, 9508 Queens Blvd., Rego Park, N. Y.

HALLICRAFTERS, National, other radios wholesale. Terms. Write. Henry Radio, Butler, Missouri.

SENSATIONAL Radio Parts Bargains! Every item listed only 19c! Heavy porcelain insulators, 8" long; Steatite 826, 829B, 823 sockets; Steatite acorn tube sockets; Pointed steel ground stake 16" long; 1K, 2K, 5K, 10K, 50K volume controls; 225 and 450 ohm field coils; hermetically sealed interstage audio transformer, 2 to 1 primary-secondary ration; 1619 tubes. Every item listed only 19c each! Hurry with your order. Send 25% deposit balance C.O.D. Minimum order $1.90. Get on our big-bargain mailing list. Mid-American, Dept. CB-11, 2412 S. Michigan Ave., Chicago, Illinois.

24 PAGE plans "18 Crystal Sets" (SW record 5800 miles). Catalog. "Radiobuilder"—all 25c. Laboratories, Eye-T, San Carlos, California.

RADIO book:—"Everybody's Radio Manual." Tells how to service all radios at home. 256 pages. 216 pictures. DeLuxe edition, $1.49. Popular Science, Dept. 28-C, 353 4th Avenue, New York 10, N. Y.

MAKE selective, distance getting crystal radios. Also one tube radios. Improved designs. Complete instructions and crystal 25c. Radio Leader, LaVerne 6, Calif.

BARGAINS—Radios, phonographs, kits, supplies. Free list. Al's Radio Service, Sioux City 7, Iowa.

26 YEARS Experience radio repairing at your fingertips. I've repaired 45000 radios. Have perfected simple system you can follow step by step. No calculations or formulas. Total price $2.00 postpaid or COD. Moneyback guarantee. Ross Radio, 1461-N Grandriver, Detroit 27, Michigan.

"LOUDEST" Crystal, radio plans, catalog, 25c. Amorose's, Route Four, Richmond, Virginia.

131 TELEVISION

WE are authorized wholesale distributors of Transvision Kits. Free alignment on old bands—engineering service on all kits free when purchased from us. Servicemen, write for literature. Telecraft Corp., 2 W. 15 st., N.Y.C.

24 BUSINESS OPPORTUNITIES

$25 WEEKLY working two hours daily No canvassing. No Manufacturing. Lycke Box 2471, Cleveland 12, Ohio.

OPERATE profitable home business selling merchandise by mail. Fast sellers. Large profits. Powell Service, 5713 Euclid, Cleveland 3, Ohio.

RECAST old batteries into new. Latest achievements. Battery Laboratories, Minneapolis

SPECIALTY Manufacturing, the big money business that can be operated anywhere, start on a very small capital; we supply dependable formulas and complete instructions; get interesting Free booklet, "Money-making Opportunities in Specialty Manufacturing." Howard Robinson, Ph. G., 1300-B S. Ohio St., Sedalia, Mo.

137 PLANS to make money local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late methods. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. E, Decatur, Illinois.

"SELL By Mail! Books And Novelties! 35 different items! Large Profits! Catalog free. Elfco, 432 N. Wells, Chicago 10.

COIN Machines earn big money! Machines are now available at $11.75 that can earn as high as $7 weekly profit. Place machines in stores, hotels, filling stations, etc., and your income starts immediately. Routes can be operated in spare or full time with no experience needed. We'll tell you how and send you a catalogue describing our nut, candy, gum and postage vendors, also scales, amusement games, etc. Write immediately to Parkway Machine Corp., (Z) 623 W. North Ave., Baltimore 17, Maryland.

EXCLUSIVE Distributor. Plasticized beauty-protection for auto finishes. Used like polish. Must fin. own stock. Plasticize, 2254 NW 62nd St., Miami, Fla.

TWELVE Different Spare-Time Jobs. Take your pick. Average $1.00 hourly. Positively no selling. Write immediately. American Business Service, Nescopeck, Pa.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

START home business making statuettes, plaques, artificial marble flooring, liquid marble, flexible molds, metallizing baby shoes. Amazing profits. Folder Free. Creative, 236-M, Winnetka, Illinois.

MANUFACTURE Yourself: Cleaners, Polishes, Cosmetics. Formula Catalog free. Kemico, 10, Parkridge, Ill.

CONVERT hand mowers to power mowers—sell the handy-dandy lawn mower conversion kits. Easily installed on any make mower in 3 hours. Used with any small gasoline or electric motor (Maytag, Power Products engines) in stock. Quick delivery. Kits can be purchased with or without engines. Fits 16 to 20 inch mower. Dealers Wanted. Write for Details. Le Claire Manufacturing Co., Le Claire 2, Iowa.

TRAVEL anywhere anytime. Earn $85.00 week up. Be your own boss. No experience necessary. Less than $5.00 investment required. Literature free. Traveler, La Grange 2, Indiana.

BIG profits and your own business casting new 1948 Metal Toys and Novelties. Latest scale model Autos, Original Ashtrays, Savings Banks, Water Pistols, etc. Enormous wholesale and chain store demand keeps manufacturers busy. No experience or special place necessary. Write for details and illustrations of patterns needed. Metal Cast Products Co., Dept. E, 1696 Boston Road, New York 60, N.Y.

DISTRIBUTORS, all territories, new simplified Bookkeeping & Tax System. Many salable features. $16.25 profit each sale. Repeats. Money maker. Opportunities. Exclusive franchise. National Accounting Service, Box PS-2, Lynbrook, New York.

WOULD you pay 3%—first $350 made? Color-illustrated book "505 Odd, Successful Enterprises" free! Some offer occasional "day off." Work home. Expect something odd! Pacific-7, Oceanside, Calif.

COLORGLAZED Concrete Pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leak-sealing. Money-making projects. Booklet, details free. Men only. National Potteries, Grand Rapids, Minn.

HOW To Set Up and Run A Mirror Shop! Resilver Mirrors. For Price write—John Sprinkle, V90, Marion, Indiana.

START business yourself. Send for list of spinner blades, shafts, beads, rudders and parts for constructing lures that will catch fish. Spinner Specialties, Inc., Lewiston, Idaho.

A FACTORY in your home garage! Mfg. and sales rights, mechanics' waterless hand cleaner. $500-$800 monthly. No special equipment necessary. Western Aircraft Mfg., Dept. G, Los Angeles 6, Calif.

AT Home — Your own manufacturing business; making popular $1.00 novelties. Cost you 3c to 15c. Everything supplied. Write So-Lo Works, Dept. C-601, Loveland, Ohio.

START advertising and letter shop. Complete home training. Free booklet. Armstrong Schools, Box 2136, Los Angeles 3, California.

METALLIZING Baby Shoes makes you money! Learn this simple, profitable business from nationally recognized authority. Little investment—large returns! Get professional "Know-How"! Free details. Joseph B. Kushner, Metal Finishing Engineer, Stroudsburg 33, Penna.

START Mailorder Bookshop—Everything furnished. 25c brings booklet, samples, exciting ideas. General Publications, Ossining 1, N.Y.

PLASTER Paris gets hard as stone. Just mix in "Roc", amazing new chemical—Air bubbles come to surface, disappear. Finished casts hard, ring like a bell. Enough for 2,000 casts only $1.00 Postpaid. Money back guarantee. So-Lo Works, Dept. C-203, Loveland, Ohio.

LEARN Piano Tuning, Repairing, at home. Tremendous field! Piano parts, tools furnished. Established 1935. Empire School of Piano Tuning, 606-A East University Ave., Champaign, Ill.

YOUR own plastic business at home. Produce costume jewelry, novelties, statuettes, liquid plastic, liquid marble, flexible molds. Write for free book. American Trades, Box 89-B-3, Cincinnati 39, Ohio.

FOR an extremely profitable lifetime business operate a Collection Agency-Credit bureau. Easily learned. Free folder. Cole & Associates, Syracuse 2, N. Y.

MEN and women wanted to place self-selling coin machines in stores, hotels, filling stations, etc. New machine earns up to $6.00 weekly—costs only $10.50. We furnish supplies and machines for nuts, gum, candy, stamps, scales and amusements. Free details of tested selling plan. Write Dept. Z, Parkway Machine Corp., 623 W. North Ave., Baltimore 17, Md.

RAISE worms—"Secrets of fishing worm Farming" $1.00, unlike anything ever printed. Whitegate, Locke 9, N. Y.

DOLLARS to you at home. Write for details. W. A. Jones, Box 395, Upper Darby, Pa.

MAKE money at home in spare time like I do. Write today for details. Business Associates, P. O. Box 263, Port Huron, Mich.

COLORADO and Wyoming's fabulous oil boom spawning new millionaires. You too want shot at $1,000—$5,000—$20,000 on investment of only $140? New high price of $2.65 per barrel for oil setting people crazy. Write me today—not tomorrow for details. I'll attend to everything while you stay home. Dyer-PS, 1835 Champa Street, Denver, Colorado.

START a business of your own cleaning drains without digging. Can earn from $300 to $500 monthly clear profit. Requires only $400 investment which can be financed on monthly basis. A good side line. Advertising helps and promotional material furnished. Write today for full details. No obligation. Ohio Tool & Engineering Co., Dept. S, Springfield, Ohio.

"MOST everybody likes candy"—Learn to manufacture in a professional manner. (Our 38th year). Ragsdale Candies, #7, East Orange, N. J.

OPERATE profitable mail order business. Write, Walter Service, 4159-B East 112th, Cleveland 5, Ohio.

FELLOW Workers—Down with Bosses—Start own business—Be Independent—Booklet describing 137 Tested Plans, free. P. Padney, 307 York St., Jersey City, N. J.

NATURAL molding latex. Extra thick. Free sample. W. Wooley 115-B Donald, Peoria, Ill.

MAKE Rubber stamps, metalize baby shoes, silver mirrors. Make plaster novelties. Catalogue of "20 ideas" Free. Universal, Box 1076-B, Peoria, Ill.

SPECIAL Rubber for making molds. Literature and sample free. Universal, Box 1076-B, Peoria, Ill.

PROFITABLE plans, ideas $1.00. Details. Spada, 10 Lexington, Wethersfield 9, Conn.

MAKE perfume. Complete outfit $7.50. Information free. Lawson, 21 Joiner, St. Augustine, Florida.

MONEY, time saved. Thousands articles wholesale, dependable, formulas, etc. Directory sheets 10c (refundable). Wayne Burger, Baltic, Ohio.

GET it for them wholesale. Be community buyer nationally-known merchandise: radios, refrigerators, washers, sweepers, typewriters, etc. Savings up to 50%. This pleasant easy work can earn up to $5000 year. Get details today. Kraft, Aurora 9, Mo.

MAIL Order Businesses bought, sold, brokered. Write for Free bulletin of exclusive opportunities. Turnipseed, Inc., Box 681, St. Louis, Mo.

UP to $1500 yearly selling by mail in spare time interest you? New ideas and plans every month. Details free. Idea of Month Club, Box 118-B, Baltimore 18, Md.

FARM Bookkeeping Service is entirely new business field with Farm Bank the "Once a Month" farm record. Send today $2.50 for Farm Bank with instructions for building profitable business. The Farm Bank Company, Colby, Kansas.

INCOME from local information. No selling. Neher Co., LaVerne, Calif.

LIQUID Rubber for making flexible molds. Cast novelties. Sample bottle 25c, free literature. Chaney, 1130 E. 16th St., Jacksonville 6, Fla.

QUICK Money! "Repairing Car Batteries." At home! Easy too! Write, Batteryman, Grand Junction 1, Colorado.

RAISE Earthworms. Instructions $1.00. W. Huffman, 391 Pleasant Lake, Rives Junction, Mich.

MAKE money spare-time. Write today. American Letter, New Market 101, N. J.

10,000 MONEY Making Formulas, ideas, plans. Literature Free. Siegel, 126 Lexington Avenue, New York 16, N. Y.

MACHINES available for making new designs of interlocking concrete building blocks. Delaware Industries, Dept. 21, Muncie, Indiana.

HOW and Where to obtain capital. Particulars free. Star Service, Wapakoneta, O.

$60. WEEKLY spare time home business. Free details. Maryland Service Bureau, Box 3803, Baltimore 14, Maryland.

SAVE—Million articles wholesale. Directory 10c. Lawsan, Box 1302-A2, Detroit 31.

"50% PROFIT business". Information $1.00. Rudolf Heupel, 826 So. Wabash, Chicago.

LIQUID Marble—colorful, glossy! Mold, brush, spray. Plastic ivory, flexible molds, composition floors. Particulars free. Marbleizing Service, Edwardsville, Illinois.

BUYERS Wanted for plaster novelties and religious statuary. Painted—unpainted, retail—wholesale. Write today for free information. Bing Products, 88-B4K Broad, Boston 10, Mass.

MANUFACTURE costume jewelry at home for profit, hobby, therapy. Free wholesale supply catalogue. Instructions. Florida Supply House, Bradenton, Florida.

MAILING postcards selling repeat merchandise is profitable. Everything supplied. Details free. Gordon Publishers, Box 23, Pawtucket, R. I.

PRESERVE baby shoes. Gold, Silver Bronze. Instructions $1.00. Johnson, 2611 Harriet, Minneapolis 8, Minnesota.

MAKE Perfume, profitable home business, men, women write "International," 6347 Parnell 12, Chicago 21, Illinois.

MAKE flexible molds to cast liquid plastics, plaster. Re-usable compound $1.75 lb. 3c brings literature. Flexco, 13501 Burley, Chicago 33, Ill.

BABY shoes, we metallize hundreds and will teach you how. Easily learned in quick time. No experience needed. Schoettle, Friendship 4, Ohio.

OPERATE home business that may mean the road to independence. Write, Sunray, 4756-B N. Bernard, Chicago, Illinois.

GET Hundreds Money Making Deals, business ideas, plans and manufacturing. Amazing folio free. Austin Mail Service, 5538 Lexington, Chicago, Ill.

WHITE Liquid Rubber for making flexible molds! Quick drying! Safe! For home, classroom, or industry! Quart $2.00. Gallon $5.95. Full instructions! Beginners booklet on molding and plaster casting 25c. Free with order! Plastercraft Supply Company, 1406 East 43rd Street, Cleveland 3, Ohio.

HANDYMEN—Earn money home operating Community "Fix-it" Shop. Write Stafford, 708 Rawlings, Carbondale, Ill.

HOME Workers wanted to hand-spin Angora Wool. Either Sex. House of Angora, S2, Springfield, Ill.

$46 FROM Square Foot Plywood; Jigsaw necessary. Write; Woodart, Bridgewater, Mass.

TYPEWRITER Repairmen urgently needed. Earn $40 to $50 weekly spare time. Our easy to learn home study course teaches how to repair typewriters. Write for free information. Houston Typewriter Repair Service, P.O. Box 5357, Houston 12, Texas.

START a clock shop while clock repairing is booming. Our easy to learn home study course with pictures and illustrations teaches you how to repair all kinds of clocks. Information free. Houston Clock Shop, P.O. Box 5086B, Houston 12, Texas.

MOLD plastics, compositions, plasters. Simplified methods. Tremendous profits. Investment small. Instructive literature free. Plastics Digest, 2917-R Michigan, Kansas City 3, Mo.

Copyrighted material

POPCORN Machines. Potato Chip outfits. Long Eakins Co., 4863 Hi St., Springfield, Ohio.

A PROFITABLE Business and hobby. Amazing liquid ivory. Liquid glass. The most marvelous synthetics ever developed. Hard to tell from expensive genuine. Easy to start. Experience unnecessary. Immediate profits. Write for valuable free information. Empire Trades, Dept. SC-2, Box 1340, St. Louis, Mo.

RUBACREAM! Natural Rubber Latex! Makes molds quicker! Thicker! Free Sample convinces! Castcraft Studios, 509-S Fifth Avenue, New York 17.

START Home plaster novelty business. Amazing course tells how. Literature free. Kemo-Courses, 4862 Catalpa, Chicago 30, Ill.

FREE literature describing 137 proven moneymaking plans. Reiss, 3017-M Ocean Parkway, Brooklyn 24.

HOT lines. Hardware—electrical. Agents—dealers. Farm Products Co., M-2012, Excelsior Springs, Mo.

$126.50 GUARANTEED weekly. Mail $1.00 deposit. Stannette, 277 Madison Street, New York 2.

LEATHERWORKERS Bible. Largest illustrated leathercraft catalog, plus valuable instructions and information. $1.00 postpaid. Satisfaction guaranteed. Act now! Artcraft Leather, Dept. P.S. 2, 271—12th St., Oakland, Calif.

FREE course raising fishworms; 25c postage, handling. Stoner's, Chattanooga 6, Tenn.

BE Wealthy. Get business self-starters. Own self-paying homes. Mid-Co., 67 S. Harris, Columbus 4, Ohio.

AGENT or exclusive distributor for cigarette lighter mfg. MacGregor, Tahoe Valley 15, Calif.

YOUR opportunity to become independent with your own profitable mail order business. Details free. Yaniw Distributors & Publishers, Youngstown, Ohio.

ELECTROPLATING Has a thousand and one uses. Make good money in spare or full time. Warner Electroplaters permit you to easily plate chromium, gold, silver, nickel, copper, etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write today for free sample and literature. Warner Electric Co., Dept. OB-P2, 1512 Jarvis Avenue, Chicago 26, Ill.

BABY Shoes preserved. Formulas, instructions, $1.00. Novelty Bronzing, Box 56, Hyde Park 36, Mass.

BIG Money In Vending Machines—Smallest capital start brings immediate profits that build permanent profitable business. Starting instructions free. Becker Vendors, 105-P Dewey, Brillion, Wisc.

FLEXIBLE Molds to order, also originals. Professional course manufacturing molds and cast novelties. Latex, lacquers, flocks, flocking equipment, supplies. Plastics, Box 1574, Boston 4, Mass.

FOR more business, operate an individual business office, exclusively under your own name. Rates $7.30 and $14.60 yearly. Cooperative Office Service, 126 Lexington Avenue, N. Y. 16.

GENUINE Natural Latex for rubber molds. Concentrated 62% solids. Creamy Viscosity. Make money casting. Trial sample 25c. Write Major Chemical Co., 131 E. Inman St., Cambridge 39, Mass.

HELPFUL books for those in the Mail Order Business or for those contemplating one. "The Mail Order Counsel Book" $2.00. "Letters that Pull" $2.00. "How to Sell by Mail" 25c. You will profit by them. Satisfaction or money refunded if books returned within 7 days. Maule, 1007 13th St., Niagara Falls, N. Y.

88 MONEY MAKING OPPORTUNITIES

ELITE Collection describes 137 money-making plans; local, mail order. Particulars free. Elite Co., 220-A Grand St., N. Y.

WOULD You pay 3%—first $350 made? Color-illustrated book "505 Odd, Successful Enterprises" free. Expect something odd! Pacific-8, Oceanside, California.

DETECTIVES Earn Big Money. Experience unnecessary. Particulars free. Wagoner, P-125, West 86th, N. Y., N. Y.

SEWING Machine Repairmen make big money lifetime. Start neighborhood shop. Complete repair manual, covering all makes. $1.98 postpaid. Money Back Guarantee. Sewmachine Serviceman, Hamilton 10-K, Ohio.

BIG money manufacturing floor tiles. Details free. U-Build-It Service, 206-A West Wilder, Tampa, Florida.

EXTRA Money? Free details. Trable, 108½ Elm Street, Dallas, Texas.

METALLIZE baby shoes. Further information — 3c stamp. Metal Crafts, Box 125-R5, Tampa 4, Florida.

"WHOLESALE catalog. (Illustrated-10c)" Bargains galore. Stafford, Box 5211, Indianapolis, Ind.

MUSICAL Glasses;—Earn excellent money evenings. Copyrighted instruction. Information, MacDermid, 1013 C Quarrier St., Charleston 25, W. Va.

MAKE $1.75 To $2.50 An Hour with your own spare-time business in radio, autos, agency, rental service, handicrafts, etc. Book called "How to Start Your Own Business" shows how to take the first step, build up to a full-time career that gives independence for life. Full facts and figures, advice from experts. Examine book and start right away. Send only $1.98 to Foremost Books, Dept. CS18, 353 Fourth Ave., New York 10, N. Y. Satisfaction or money back guaranteed.

LEARN Battery repairing, rebuilding. Engineer offers money making methods. Battery Bureau, 2225 North 44th St., Milwaukee, Wisc.

WIN contest money. General Contest Magazine gives hundreds of tips. Lists current contests and rules. Sample 25c. General Contests, 1609-A East 5th, Duluth, Minn.

PRIZE Contest Fans Reap Rich Rewards. Enclose 3c stamp. National Contest Bulletin, Box 2685-S, Miami 31, Fla.

"THERE'S Big Money In Junk," and repairing Car Batteries! Batteryman, Grand Junction, Colorado.

UNPAINTED Plaster Ornaments: Beautiful designs, easily decorated with water colors or oil paints. Profit or Hobby. Illustrated List Free, distributors of New Loxite, A Firestone Product, for Molds. Midwest Novelty Mfgrs., 108 Cedar, Anaconda, Montana.

EARN money evenings, copying and duplicating comic cartoons for advertisers. Adservice, Argyle 2, Wisconsin.

MANUFACTURE costume jewelry at home for profit, hobby, therapy. Free wholesale supply catalogue. Instructions. Florida Supply House, Bradenton, Florida.

START your own business! Big money manufacturing novelties, plaques, statuary. Free catalog. Write Bing Products, 88-B4H Broad Street, Boston 10, Mass.

MAKE Perfume, profitable home business, men, women write "International," 6347 Parnell 14, Chicago 21, Illinois.

100 LEADING wholesalers offer thousands of new, profitable items. List 25c. Lawrence, 280 North McNeil, Memphis 12, Tennessee.

ELECTRIC Clocks are everywhere you go, buildings, homes, parking-lots, factories. Repairs increasing. Our easy to learn course with pictures and drawings teach You how to repair these clocks. Electronic Supply Co., Box 2350-B, Houston 1, Texas.

"I AM a Preacher, nevertheless made over $3000 in 30 days honestly, legitimately. I believe many others can, also. Will you risk a dollar bill for the secret? This is not a gag. F. J. Winder, 4638 N. E. 34, Portland 11, Oreg."

ELECTROPLATING Has a thousand and one uses. Make good money in spare or full time. Warner Electroplaters permit you to easily plate chromium, gold, silver, nickel, copper, etc. Plating equals costly commercial jobs. Pay for your electroplater in a short time by plating for others at a profit. Write today for free sample and literature. Warner Electric Co., Dept. MO-P2, 1512 Jarvis Avenue, Chicago 26, Ill.

PROFIT Silvering mirrors, special process, 25c postpaid. Zonol, Box 2255-S, Cleveland, Ohio.

WIN Contest money, send 25c guaranteed instructions for writing winning answers. Winacontest, 22 Westlake Ave., Auburn, N. Y.

HOME business plans, golden opportunities, 10c. Holm, 12B Oaklandon, Indiana.

INCREASE your earnings! Local business opportunities; Mail order information; Wholesale supply sources; Valuable money-making tips; Information. Free details, rush name! Wilkin Company, Hillsboro 2, Ohio.

WANT more money, independence, happier living? New money-making catalog, lists hundreds of mail order business plans, ideas, to point the way. Just 10c brings your copy. Hurry! Silvercrest Publications, 3040-J West North Avenue, Chicago 47, Ill.

EARN money selling Bagatelle Games. Sample mailed $1.00 postpaid. J. Siegfried, 377 B'way, N. Y. 13, N. Y.

FREE literature describing many proven money-making plans. Reiss, 3017-R Ocean Parkway, Brooklyn 24.

READ "The Hamster Manual". Learn everything about the new money-making wonder animals from Syria. Tells where to buy and sell these delightful animals. Beautifully illustrated. Copy, $1.00. Albert F. Marsh, 1516 Basil, Mobile, Ala.

SIDELINE: "Gold finished lapel cross." Sample 20c. J. Walter, 39 Bath (5) Ballston Spa., N. Y.

59 FORMULAS, PLANS, ETC.

137 MONEY-making plans, also formulas for salable products. Descriptive booklet free. Elite Co., 220-A Grand St., N. Y.

10,000 FORMULAS and Trade secrets. Free Literature. Stillmans, 555 Kingston Ave., Brooklyn 3, N. Y.

REAL manufacturing formulas. Lists free. Cumming Chemist, Gordon Avenue, Syracuse 4, N. Y.

FREE to car owners. Sixteen money, time and trouble saving suggestions. Suproco, Ogema 7, Wisconsin.

EVERYBODY: Have you read "Strictly"? A "must". Newest, greatest 50c value in history. Important formulas, plans, propositions, information. Be prosperous. Order today. No stamps. Circular free. Teycer, Chemist, Box 1287 3/4, Chicago 29.

10 MONEY-making poultry remedy formulas, $1.00. Pont, Box 635-S, Terre Haute, Indiana.

400 MONEY making plans. Ideas. Formulas. Schemes. Tips. Folio Free. Formico Press, Box 572, Dayton, Ohio.

106 PLASTICS

PLASTIC—Sheets, Rods, Tubes, etc. Free List. Plastic Supply Co., 2618 St. Louis Avenue, St. Louis 6, Mo.

GLOW in the dark. Plastic house numbers, 25c each. Postpaid. Holliday Plastics Co., P. O. Box 656, Chester, Penna.

PLEXIGLAS. Masked sheets. 12"x12" 1/16" $1.00. ⅛" $1.25. 3/16" $1.55. ¼" $1.85. Include 10% postage. Internal carvings, drills, dyes. Luminous Powders, rods, tubings, cements. Jewelry findings. Free catalog. Craft Plastics, Somerville, N. J.

INTERNAL carved swans, bluebirds, goldfish, butterflies, etc., pins. $1.50; 2½ x 2½ x 2 paperweights. $2.50; roses costume jewelry sets. $1.50 less findings; 2 x 2 x 2 paperweights $2.00. Crystal, Floral Novelty Co., Somerville, New Jersey.

"PLASTICS—Sheets, rods, tubes, all colors; dyes, supplies; findings. Illustrated fabricating manual, prices, 10c. Lucite sample, 35c. Gem-O'-Lite, Box 686G, North Hollywood, Calif."

VALUABLE publication "How and Where to Sell Your Molded Plastic and Plaster Casts Profitably," only $1.00. Postal brings free details. Banks, 6635-16 N. Ave., Kenosha, Wisc.

FABROS Pre-fabricated plastic kits and supplies. Sample kit 50c. Catalog free. Fabros, Box 156, Station F-2, Buffalo 12, New York.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

10 ENTIRELY new ideas, plastic projects, $1.00. Designers Group, Box 363, Pleasantville, N. Jersey.

PHOSPHORESCENT plastic sheet stock. Can be cut, sawed, sanded or filed. Trial sheet 12 in. x 6 in. X ⅛ in. $1.00 postpaid. Holliday Plastics Co., P.O. Box 656 Chester, Penna.

FORMALIN for lustrous color-castings. Complete line plastics casting supplies. Free literature. Sample kit $3.00 F.O.B. Formalin, Romeo, Michigan.

NEW Liquid plastic. Clear, colors. Cast without heat. Embed flowers, insects, coins. Saw, drill, carve. Manual tells how. Send $3.50 (West Coast, Canada, Mexico $3.75) for complete 20 project kit including one pound liquid Castolite. Castolite, Dept. P-42, Box 211, Kenilworth, Ill.

LEARN Internal Carving of Plastics for pleasure and profit. It's easy, exciting to carve flowers, animals, landscapes of colorful, thrilling beauty in solid Plexiglas plaques and cubes. Send 10c for complete instruction folder, jewelry findings catalog, and big plastics price list. Plastic Parts, Dept. H-6127, 1157 S. Kingshighway, St. Louis 10, Mo.

SAMPLER contains casting-plastic, instructions, models, molds, materials, everything for casting several small, salable novelties. Only $2.00. Circular free. Artcraft, 2917 Michigan, Kansas City 3, Mo.

33 CHEMICALS AND APPARATUS

CHEMICALS-Lab. Supplies New Catalog 10c. Mel-Glo Chemical Co., 258 Fourth Avenue, Brooklyn 15, N. Y.

LUMINOUS Paints will glow in dark. Six colors. Fairmount Chemical Co., 136 Liberty St., New York City 6.

LEARN Chemistry at home, from the House of Winn. Home of Supplies for student Chemists. New idea chemical and apparatus outfits for Home Experimenting. Semi-Professional Microscopes and accessories. Send 10c for retail catalogue. Established 1931. John H. Winn, Dept. 602, 124 West 23rd Street, New York 11, N. Y.

NEW laboratory Supply Catalog of Chemicals and apparatus. Contains over 5000 items with illustrations, 212 pages. Send 50c. Standard Science Supply Co., 1232 No. Paulina St., Chicago 22, Ill.

HANDBOOK for Chemical Experimenters. Hundreds of Experiments; Illustrated, 50c. Experiment Booklet, 15c. Supply Catalog, 5c. Reading Scientific Co., Reading, Penna.

CHEMICALS and apparatus for industrial, analytical, and private laboratories. Complete supply service for correspondence school students. Send 10c for catalog. Dept. M-26, Biological Supply Co., 1176 Mt. Hope Ave., Rochester 7, N. Y.

CHEMICAL apparatus bargain catalog for stamp. Ross, B-68 West Broadway, New York, N. Y.

FREE catalog: Chemistry, Mineralogy, Biology, Physics. Tracey Laboratories, Evanston, Illinois.

LABORATORY Supplies, Chemicals, Glassware, etc. low prices. Large catalog 15c Microscopic Stain Catalogue 20c. Both for 25c. National Scientific Company. Established 1908. 2204 W. North Ave., Chicago 47, Illinois.

COMPLETE Supply Catalog, 10c. Pilgrim Chemical, 348-AA Edith, Salt Lake City 4, Utah.

CHEMICALS, ounce quantities, apparatus, catalog 10c. Fleischer's Laboratories, Everett 49, Mass.

CHEMICALS — Inorganic - Organic, all quantities. Laboratory equipment, all types. Send 10c for catalog. Met & Co., 160 Hillside Avenue, Nutley, N. J.

68 HELP WANTED

"Alaska — The Last Frontier" offers thousands of excellent opportunities. $1.00 brings government map and copyrighted report with authentic listings in fishing, mining, fur farming, prospecting, aviation, construction, homestead lands. Alaska Opportunities, P. O. Box 883, Dept. PS, Hollywood 28, Calif.

SALESMEN: Big money showing building owners sensational product; cuts essential repair cost up to 75%. Six average orders weekly pay you over $190.00. Age: 30 or over. Get moneymaking facts. Write, Zone Co., Dept. B-8, Box 789, Ft. Worth 1, Texas.

INTERESTED in Latin American and Foreign employment? $1.00 brings copyrighted Foreign Service Directory, with hot list of concerns interested in oil, mining, aviation, construction, transportation, manufacturing. How-when-where to apply. Global Reports, P.W. Box 883, Dept. PS, Hollywood 28, Calif.

WANTED: Men and women full or part-time to assist us in distributing the World's most beautiful and simplified index reference Bible (King James Version). Prefer those who are prominent in church and social affairs, well-known in community. Unusual opportunity for men and women looking for a business of their own. Installment sales experience helpful but not essential. Write today for our new unique plan of distribution. Department A, Lloyd Distributors, Post Office Box 1221, Charlotte, North Carolina.

FOREIGN Employment!? List of 70 companies with foreign interests $1.00 or COD. Foreign Service Institute, Box 3934, Miami 24, Fla.

EARN up to $520 Month part or full time keeping books for small firms. Simplified System. Write Tax Saver System, Dept. B, Ft. Worth, Texas.

5 AGENTS WANTED

GOOD Paying Business Silvering mirrors, plating autoparts, reflectors, bicycles, bathroom fixtures, etc., by late method. No tanks or shop required, outfit furnished. Free Booklet. Gunmetal Co., Ave. G, Decatur, Illinois.

LICK After-war layoffs; Start own business; home, office. Booklet describing "Collection of 127 Tested Plans" free. Elite Co., 220 Grand St., New York.

AGENTS. Sell finest Food Products direct to homes. Successfully sold for 25 years. Big profits. Powerful combination sale plans make sales easy. Permanent repeat business. Samples furnished. Live territories open to Distributors. Mother Hubbard Products Co., 4139 Grand, Dept. PS, Chicago.

JUST Out! History of World War II. Huge Volume. Popular price. Authentic text. Official photographs. Big profits. Riverside Book Company, Iowa Falls, Iowa.

EXCELLENT Sideline for printing and advertising salesmen. Decalcomania name plates in small quantities. Great demand. Also, make money with our line of Automobile Initials and Sign Letters. Free Samples. "Ralco", XL-Roxbury, Boston 19, Mass.

AGENTS—Big Line Including Food Products. Fast selling premium and bargain deals. Low prices. Send card for big outfit offer with gift Ho-Ro-Co., 2726 Dodier, St. Louis 7, Mo.

SCHOOL Seniors—Earn 40% commission selling classmates America's most beautiful Graduation Name Cards. Largest selection. Outsells all others. Send for free sample kit. Printcraft, 1425 E. Elm St., Scranton 5, Penna.

MAKE More Money selling personal initialed individualized belts, buckles, cap badges, tie holders. 2000 emblems to choose. Big profits, whole or part time. Write today special outfit offer. Hookfast Specialties, Box 1425, Dept. 7, Providence, R. I.

SELL Delicious Candies, Nuts, Gum. Immediate delivery. Write Casterline, 2031-SE Sunnyside, Chicago 25, Ill.

AGENTS—300% profit selling genuine gold window letters; stores and offices. Free samples. Metallic Letter Co., 437 N. Clark, Chicago.

ADVERTISING Book Matches—Cash In On Political Campaigns—sell Union Labels matches. Cuts for all businesses and political parties—Free powerhouse selling kit—low prices—protection guaranteed on repeat orders—Cash Commissions. Superior Match Co., Dept. P28, 7530 Greenwood, Chicago.

GOLD lacquered Window Sign Letters. Large Sizes Penny Each. New Foils. Absolutely Beautiful. Free Samples. Atlas, 544 W. 79th, Chicago 20.

JOBS Open In Selling! Send name, address for Free copy Opportunity Magazine, listing hundreds of companies who need men now, full or spare time. Experience not essential. Opportunity, 28 E. Jackson, Dept. 15, Chicago 4, Ill.

ABSOLUTELY Free! Big package actual sample fabrics and style presentation of dresses, lingerie, hosiery, etc. Take orders. Commissions big. Send no money. Melville Co., Dept. 4572, Cincinnati 3, Ohio.

FREE Sample! Big profit opportunity with amazing Glow-In-The-Dark house number, switch plates, pictures, decals, religious articles. Represent large manufacturer, Madison Mills, 303 4th Ave., New York, N. Y.

CALL On Friends With Greeting Card assortment, birthday, get-well, others. Floral stationery. Gift wrapping. Big profits. Experience unnecessary. Samples on approval. Wallace Brown, 225 Fifth Ave., Dept. B-4, New York 10.

WOULD you pay 3%—first $350 made? Color-illustrated book "505 Odd Successful Enterprises" free! Proven! Work at home, office. Expect something odd! Pacific-6, Oceanside, California.

BE first: Get free details. Earn big money at home. Spare time. Easy, pleasant, exciting, unlimited. 1930 Adoline, Fresno, California.

FREE! Big box actual full size packages foods, groceries, home needs, sent fob factory. Try them at home and show friends. World beating money making opportunity. Write Zanol, Richmond St., Dept. 6091-B, Cincinnati 3, Ohio.

A DRESS yours with every 3 you order for yourself and family. Amazing new bonus plan. Everything Free. Harford Frock, Dept. H-9129, Cincinnati, Ohio.

EARN Big Money Fast! Sell finest-quality advertising work uniforms to garages, factories, filling stations, etc. Free selling kit. Topps, Dept. PS-248, Rochester, Ind.

EARN Big Money. 21 Sunshine Everyday Cards for $1, with beautiful floral lined envelopes. Sensational value. Take orders galore. Costs 50c. Sells $1. Also 1948 Sunshine notes, birthday monogram stationery 50 for $1., Gift wraps, samples on approval. Write today. Sunshine Art, 115 Fulton St., Dept. PS-2, New York City.

STARTLING, sensational combination flourescent desk lamp and photo frame. Easy seller. Big profit. E.C.A., 2518 W. Montrose, Dept. P, Chicago 18, Ill.

BIG profit. Quick sales. Automatic adding machine sells for $21.50. Your profit $10.00. Write for selling plan. Allied, 2518 W. Montrose, Dept. P, Chicago 18, Ill.

AT last! Something new and sensational in Everyday Cards. New, gorgeous satin and velour designs. Get orders fast. Big profits. Imprinted stationery. 14 assortments for year 'round occasions, retail 60c to $1. Get samples on approval. Puro Co., 2801 Locust, Dept. 841-A, St. Louis 3, Mo.

SELL advertising booklets, service stations, garages, free literature. Ruberts, Carthage, Ill.

AMAZING new zipper shoe sells on sight. Big cash profits for salesmen. Leads line 200 splendid styles. Territory open. Get Free sample outfit. Write Victor Thomas, Dept. V-26, Chippewa Falls, Wis.

BUILD, enjoy own local shoe business. Sell amazing, new patented Miracle Cushion Shoes. Complete line, entire family. No investment, experience unnecessary. Free samples to producers. Free outfit. Paragon Shoes, 728 Columbus, Boston.

NEW "Sponge" Wall Cleaner. Erases dirt like magic. Wallpaper, painted walls, ceilings. Saves redecorating. Lightning seller. Samples sent on trial. Kristee 118, Akron, Ohio.

SILVER cleaning, plating, polishing liquid (NuSilver). Apply with cloth. Renews silverplated ware, articles, pieces. Silverplates brass, copper, bronze. Female, male, selling representatives wanted. Part, full, time. NuProcess Products, Aurora, Illinois.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

MAKE extra money handling magazine orders in your community! Build your own business. Helps furnished. Big demand. Wholesale catalog sent free. Write today. McGregor Magazine Agency. Dept. 13, Mount Morris, Illinois.

MAKE Money Fast showing exquisite greeting cards — Birthday, Valentine, Easter, Wrappings, Notes, Stationery. Full-Spare time. Amazing profits, bonus. Special offers. Opportunity for organizations. Free Stationery Samples. Feature $1.00 all occasion assortment on approval. Write today. Hedenkamp, Dept. F-43, 343 Broadway, New York 13.

$1 STARTS you in business. Sell DeLuxe ties, 100% wool interlining. Costs you only $7 per dozen, you make $5.00 dozen. Send $1.00 for special introductory offer two DeLuxe ties. Catalog complete line free. Phillip's Neckwear, 20 West 22nd St., Dept. P-19, New York 10.

EASY! Fascinating! Profits to 100%. Bonus. 31 new greeting card boxes 30c up. 5c and 10c individual cards, stationery. Request free name imprinted and floral stationery samples, free 32 page catalog and $1.00 all occasion assortment on approval. Special offers. New England Art Publishers, North Abington 80, Mass.

SCHOOL Seniors: Sell classmates superb Craftcards for super profits. Write Craftcards, Box 235(AH), Pittsburgh 30, Pennsylvania.

SCHOOL Seniors!!! Your postal will bring our wonder, Kwick-Sell catalog of popular graduation name cards. Biggest profits$!!! Only firm giving free souvenir chest and card case. Don't miss out! Hurry that postal!!! Craftcards, Pittsburgh 30, Pennsylvania.

SALESMEN. Earn $100.00 weekly, selling only six pair shoes daily. Commission and bonus. Wide variety for men, women, children. No investment. Experience Unnecessary. Tanners Shoes, 209, Boston, Mass.

EARN money quickly, easily, pleasantly, showing greeting cards, stationery, wrappings. No experience needed. Up to 100% profit. Send today for everyday assortment on approval. Free personal stationery folder. Thomas Terry Studios, 200 Union Avenue, Westfield, Mass.

AMAZING offer—$25 is yours for selling fifty $1.00 boxes of entirely different, new DeLuxe all-occasion cards. Each box sells for $1.00, your profit 50c. It costs nothing to try. Write today for samples. Cheerful Card Co., Dept. 243, White Plains, N. Y.

SELL New—used clothing from home, auto, store. Men's suits $1.17. Leather jackets 85c. Overcoats 62c. Dresses 17c. Ladies' coats 38c. Other bargains. Catalog free. S & N, 565 A. Roosevelt, Chicago.

SILVA-47 Cream Polish adds pure silver to sterling and plate, as it cleans and polishes. Silver plates brass, copper, bronze. Steady repeat sales to hotels, clubs, restaurants, hospitals, institutions, better homes. Experienced, executive type salesmen wanted to organize exclusive territories. $1.00 (refundable) brings demonstrator bottle, literature, sales plan. United Technical Labs., Morristown 3, N. J.

"WORLD'S Latest" Sinco line of calendars and advertising specialties open for a few swift hard-hitting, experienced men who can qualify. Write today. H. W. Singleton Co., Dept. P.S., Salt Lake City.

AMAZING Profits selling personal initialed individualized buckles, belts, cap badges, tie holders, flexible cap bands, 2000 emblems to choose from. Repeats. Write today special outfit offer. Hook-Fast Company, Box 480-PS, Roanoke, Virginia.

90c PROFIT each $1 sale! Sell real mothproofing solution. Employ agents. Experience unnecessary—we tell how. Kinford, Wayne 4, Penna.

CHOOSE Your Own Future, with importing-exporting. Sell-buy abroad make 1,000% profit. Master world trade principles quickly, easily. Send $1 for two Bulletins supplying addresses of hundreds overseas firms seeking connections. Money refunded if unsatisfied. Benko, 246-S Fifth Ave., N. Y. 1.

SELL Ultra blue stock signs to stores, 1000 slogans, comedy, general, religious. 7 x 11, cost 6c, sells 35c. Make money. Sample free. Lowy, 8 West Broadway, Dept. 328, New York City (7).

$3 FIRE Extinguisher sells wholesale or direct. "Fire-Killer", 101 Franklin, Syracuse 1, New York.

QUICK extra cash. Sell value plus greeting cards. New 1948 line, 30 boxes retailing 60c to $1.00 each. "Flower-of-Month" and initial stationery, first name imprinted remembrance notes. Profits to 100%. Extra bonus. Special offer. Write today for feature all-occasion samples on approval and free name imprinted, floral stationery sample portfolios. Elmira Greeting Card Co., M-43, Elmira, N. Y.

SELL printing. Lowest prices in America Adams-PS, 30 West Washington, Chicago 2.

DISTRIBUTORS Wanted For Unusual Products. Levine's, 15-S Boulevard Station, New York 59, N. Y.

AGENTS Wanted for our Slot Machines and coin operated amusement games in every town and community. Sell to clubs and homes, or start a route. Webb Distributing Co., Dept. P40, 6 So. Kedzie Ave., Chicago 12, Ill.

SELL Ferto-Pots to every garden, vegetable grower. Shipped by mail. Write Allen Co., Pittstown, N. J.

$221.90 IN One week—Unusual? Not at all! Just look at one week's earnings of these representatives. SWB $247.84, JRS $252.80, HMT $242.75, HC $252.93, HET $319.38, OP $442.40. Direct mail campaign brings hot leads right into your home. Remarkable product does part of 10 men's work—a "natural" during these labor problem days. Has perfect sales story—sells year 'round. As modern as radar! Free equipment offer! We extend credit, deliver and collect. No capital required—no experience necessary. You make big profit on first sale and full credit on repeat business. Every business, store, home, factory, etc., are prospects. Write John Porter, 2433 Indiana, Dept. 328, Chicago 16, Ill.

MAKE money at home like I do! Write immediately. Duffy, Covington 5, Ky.

AMAZING new invention. Needed by thousands. 500% profit. Send dime for sample. Full information. Krueger, Box 812, Oakland, Calif.

TURN $1.00 into $50.00! Platen Renew, Box 403-S, Indianapolis 6, Indiana.

FAST Selling Carded Auto Accessory and Other Items, write Steele Plastics Co., Ashland, Ky.

SELL!! Balloons, Combs, Specialty Merchandise. Carleton House, Distributors, Texas City, Texas.

EXCITING DETAILS, shows "how" you make big profits with our fast-selling new lines! Plastic tablecloths, aprons; Personalized, cotton pillow cases, many other sales-appealing items, novelties! Hurry! Royalty. Box 748-D, Passaic, N. J.

FACTORY rejects imported briar pipes. Only surface flaws. Regularly $3.50 to $10.00. Below manufacturing cost 2 for $1.00. Satisfaction guaranteed. Gaylords, Dept. PS, Brockton 64, Mass.

DEALERS Wanted to sell fishing tackle, lawn mowers, electric drills. Decola Teresi, 1703 Olson Hiway, Minneapolis 5, Minn.

INFORMATION — Wholesale supply sources. Moneymaking plans. Increase your income. Write Reynard Service, Smithfield 3, Ohio.

69 HIGHGRADE SALESMEN

START Your own business on our capital. Always your own boss. Hundreds average $6,000 to $25,000 annual sales year after year. We supply stocks, equipment on credit. 200 home necessities. Selling experience unnecessary to start. Wonderful opportunity to own pleasant, profitable business backed by world-wide industry. Write Rawleigh's, Dept. B-U-PSC, Freeport, Ill.

POCKET PAL: Replaces pocket knives. New. Safe. Beautiful. Always razor sharp. 50c seller, 231% profit. $15.00 or more daily. Agents, Salesmen, Distributors. Sample 10c. Nelson MFG. Co., 222 W. Kellogg, St. Paul 2, Minn.

MEN wanted at once. Full or part time. Just send name, address for free copy of Specialty Salesman Magazine giving hundreds of immediate openings with reliable firms. Sales experience unnecessary as we also send free 42 page book telling how. Specialty Salesman Magazine, Dept. PS-12, 307 N. Michigan, Chicago 1.

EDUCATIONAL salesmanager. Lecture course. $15,000 class Commission. Most states open. Air-Mail Application. Professor Martin, 406 Panama Bldg., Portland 4, Oregon.

ADVERTISING Book Matches—World's largest direct selling manufacturer of Advertising book matches offers opportunity for profitable year 'round selling; Every business a prospect; No experience needed to start; Men or women; Full—part time. Factory service. Low prices for high quality; Repeats; Sales kit furnished. Match Corp. of America, 3433-43 West 48th Place, Dept. N-15, Chicago.

AMAZING discovery. Master Glaze, puts brilliant glass-like surface on cars. Free sample, information. Big commissions. Master Glaze, Dept. 638, 7720 Harwood, Milwaukee, Wisc.

WAR Surplus—Oil transmissions, input up to 2 h.p. @ 4000 r.p.m. Output infinitely variable either direction. Suitable for motor scooters, mechanisms, etc. $25.00 fob. Keego Harbor, C. J. Cartwright, Box 583, Keego Harbor, Michigan.

RECEIVE giant mails, samples Galore! Two year listing, $1.00. Nine months 50c; three months, 25c. Stanford, 622 N. 16th, Philadelphia, Pa.

47 EDUCATIONAL AND INSTRUCTION

HAVE your own office! Many earn up to $5,000-$15,000 Annually. Learn credit-collection agency business by home study course. Experience unnecessary. Write for Free bulletin. No obligation. Franklin Credit School, Dept. 203-B, Roanoke 7, Va.

MAKE up to $30-$40 week as trained Practical Nurse! Learn quickly at home. Booklet free. Chicago School of Nursing, Dept. M-2, Chicago.

WHY Don't You Write? Writing short stories, articles, etc., will enable you to earn extra money. In your spare time we teach you to write the way newspaper men learn—by writing. Free "Writing Aptitude Test" tells whether you possess the fundamental qualities essential to successful writing. Veterans: This course approved for Veterans' Training. Write Today! Newspaper Institute of America, Suite 5668-B, One Park Ave., New York 16, N. Y.

1948 GOVERNMENT jobs! Start as high as $58.09 week. Men—women. Vets get preference. Prepare now for next examinations. Particulars Free. Write today. Franklin Institute, Dept. 723, Rochester 4, N. Y.

BEST Radio Training is inexpensive, for information write Electronic Industries, Princeton, Kentucky.

BECOME a Doctor of Psychology or Metaphysics. Teach secret of contentment, happiness. Win degree of PsD. or MsD. Solve mental worries. Free book. College of Universal Truth, 5153-K N. Clark, Chicago.

SUCCESSFUL Men are good at figures. Add, divide, subtract, multiply easily and with lightning-like rapidity—and always be right! Make your associates envious; astound your boss. Increase your efficiency. Become a "quick-at-figures" topflight executive. Write for Free literature: Addograf S-1209 South Garfield Ave., Alhambra, California.

LEARN Piano Tuning. Prepare for Career in fascinating profession. $5000 year easily earned. Real security, pleasant easy work. No profession Paying so well can be mastered so quickly. Natural Aptitude, desire to get ahead chief requirements. Prospectus and full information on request. Harmony School of Piano Tuning, Box 582, Harrisburg, Pa.

BOATING, learn at home. Seamanship & Piloting. Cruise scientifically. Compensate your own compass. Prepare for a job on the water. Yacht captains earn to $500. monthly. Fairway School, Box 811, Old Greenwich, Conn.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

TRIGONOMETRY. Learn;—Solve problems accurately! "Magic Circle" device. Enclose $1.00. Guaranteed! EdCo Scientific. Box 531-K, Hollywood.

BOOKKEEPERS! Increase your earnings! Operate your own simplified "Dollar-A-Week"—Bookkeeping and Tax Service. Full or spare time. Details Free. No obligation. Ellis. Box 207-G. Cedar Grove. N. C.

CLINICAL Laboratory Technicians in great demand. We train you in your spare time, in your own home. You can practice while studying. Write for free catalogue Imperial Technical Institute. Box 973-B Austin, Texas.

WELDING—Electric, gas trade training pays at GI approved Welding school. Catalog free. Write Hobart Welding School. Box P-285. Troy. Ohio.

BE an auctioneer 3 week term soon. GI approved free catalog. Bockelman Auction School. Dept. J. Sioux City. Iowa.

RADIO Copy writing—A fascinating profitable career. Home study course by experts prepares you fully. $1.00 brings first lesson. Neil Robinson. Box 1036. Stamford, Conn.

AMAZE with Super-memory. Step up your brains and income. Get facts free. Write CS2. Thor Books. Box 1210. Chicago.

3800 LATEST used correspondence courses catalog 50c. EG. Elmsford. N. Y.

39 CONTESTS

$25,000. $20,000 FREE!—Contests. You can win. Need help? Write. Research. 13 Earl St., Red Bank. N. J.

77 LANGUAGE OUTFITS

LINGUAPHONE Makes Languages Easy at home. Learn to speak Spanish. Portuguese. Italian. French. German. Russian, by quick, easy Linguaphone conversational method. Save time. work. money. Linguaphone Correspondence Courses are available to veterans under G.I. Bill of Rights. Send for free book. State if G.I. Linguaphone Institute. 54 RCA Bldg., New York 20. N. Y.

10 AUTHORS SERVICE

NEW Writers Needed. Nonfiction material demand is booming. Many magazine editors buy features and "fillers" from new writers. Our Earn As You Learn lessons prepare you to meet their requirements. Experience unnecessary. Reasonable price. unexcelled service. Details. sample lesson free on request. Use postcard. No obligation. Comfort Writer's Service. 210RN S. 7th St., St. Louis 2. Mo.

25 BUSINESS SERVICE

LETTERS remailed 25c. three 50c. H. N. Johnson. Desk C. Box 85. Jacksonville 1. Fla.

PURCHASING Agent—$1.00 minimum charge 10% large orders: Clothing. furs. machinery. tools. etc. Satisfaction guaranteed. References. Fenwick's Service. 1216 Park Row Bldg., N. Y. 7.

30 CARTOONING, SIGN PAINTING, DRAWING AIDS

"HOW To Make Money With Simple Cartoons"—A book everyone who likes to draw should have. It is Free; no obligation. Simply address Cartoonists' Exchange. Dept. 192-C. Pleasant Hill. Ohio.

9 ALPHABET 3 Numeral Pattern Sets and Catalog $1.00. Sign Letter Distributors. P. O. Box 101. Mineola. N. Y.

FAMOUS $75 Lockwood Art Course now only $5 postpaid. Other smashing art bargains. Catalog 10c. Art Book Shop. Arnold 6. Mo.

LEARN Showcard writing at home in spare time. Fascinating. profitable business of your own. Free information. Sherwood. Box 8. Irvington 11. N. J.

PHYSIQUE Studies 150 different poses $1.00. Gene Jantzen. Bartelso. Illinois.

CARTOONING—without training. Complete kit $1.00. Will Rogers. Old Hickory. Tenn.

TALENT Test Free. American School Commercial Art. Box 8066. Dallas 5. Texas.

SIGN painting taught at home by an old master. Ben Kerns. Box 812. Greenville. S. C.

SIGNS made easily. Instructions and ten sets modern alphabets. numerals. patterns. Sizes up to eight inches. All for $1.00. Co-operative Business. 7 West Madison. Chicago (2).

31 CHALK TALK STUNTS

CHALK Talks. Laugh Producing Program. $1.00. Illustrated Catalog 10c. Cartoonist Balda. Oshkosh. Wisconsin.

136 TYPEWRITERS

RECONDITIONED Typewriters. Printing Devices. Office Appliances Supplies Dixiegraph. King. N.C.

110 PRINTING OUTFITS, SUPPLIES

"PRINTOMATIC" Selffeeding Post Card Stencil Printing Duplicators $9.50 Up. Office Size Duplicators. Speedoprints. Hilcos. Excellographs $33.41 Up. Literature Free. Pittsburgh Typewriter Supply. 336 WE Fourth Ave.. Pittsburgh 22. Pa.

PRINTING presses. type. supplies. Send dime for complete illustrated printer's supply book. details and press samples. Kelsey. Inc.. A-8. Meriden. Connecticut.

CUTS: 2100 designs. 49c each. Catalog dime. 337A West Mason. Jackson. Mich.

INEXPENSIVE home-made printing press. Details free. Novelty Shop. Downsville. Louisiana.

PRINTING Presses. Type. Supplies. Lists 3c. Turnbaugh Service. Loysville. Penna.

RUBBER Stamps all kinds. catalogue 10c. Print and Stamp Co.. Box 172. Boston 1. Mass.

100 ENVELOPES. 100 Noteheads Beautifully printed $1.00. Scholler. 530 Dunloe. Pittsburgh 12. Penna. Graduation Card. Agents Wanted.

109 PRINTING, MULTIGRAPHING, ETC.

DISTINCTIVE Printing — Stationery. Checks. Cards. Reasonable. Samples. Prices Free. Stumpprint. South Whitley 2. Indiana.

1000 BUSINESS cards printed prepaid $2.50. Reliable Print Shop. 901 E. Jefferson. Louisville. Ky.

24 HOUR printing service. Free samples. Mango. 555-B South 20th. Newark 3. N. J.

QUALITY Printing: Business. personal stationery. State requirements. Samples. Mero Products. 99 Morrison. Punxsutawney. Penna.

SEND 10c Now. for our 48 page price-list—Refunded first order. McCall Press (PSM). 1326 South 27th. Omaha 5. Nebr.

1000 GUMMED labels $1.00. List free. Box PS-135. Spiro. Oklahoma.

98 PATENT ATTORNEYS

INVENTORS: Without obligation, write us for information as to what steps an inventor should take to secure a Patent. Randolph & Beavers. Registered Patent Attorneys. 340-A Columbian Bldg., Washington 1. D. C.

INVENTORS: Write for free brochure "Evidence of Invention." Labiner. World Building. New York 7.

INVENTOR'S Guide free on request. Frank Ledermann. Registered Patent Attorney. 154 Nassau St., New York 7. N. Y.

INVENTORS. For "Record of Invention" form. contact Carl Miller. Registered Patent Attorney. Woolworth Building. New York.

INVENTORS—Send today for "Detailed Patent Information" outlining preliminary steps to be taken toward Patent Protection. also convenient "Evidence of Invention" form. Victor J. Evans & Co., 341-B Merlin Building. Washington 6. D. C.

INVENTORS: When you are satisfied that you have invented something of value write me. without obligation. for information as to what steps you should take to secure Patents or Trademarks. Write Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 938 Columbian Bldg., Washington (1). D. C.

INVENTORS: Learn how to protect your invention. The patent laws afford inventors protection for the patentable features of their inventions. The United States Patent Office advises the inventor. unless familiar with such matters. to engage a competent. registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters. "Patent Guide" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 82B-B District National Bldg., Washington. D. C.

PATENT practice before U. S. Patent Office. Validity and infringement investigations and opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster. Allwine & Rommel. Registered Patent Attorneys. Suite 413. 815—15th St. N.W.. Washington 5. D. C.

PATENTS—Trade marks. Irving L. McCathran. 316 McLachlen Bldg.. Washington 1. D. C. Registered Patent Attorney.

C. A. Snow & Co.—S-427. Snow Building. Washington 1. D. C. Registered Patent Attorneys. Write for information.

INVENTORS — Patent Laws encourage the development of inventions. The Rules of Practice of the U. S. Patent Office advises—unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent. as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow. Berman & Davidson. Registered Patent Attorneys. 143-V Victor Building. Washington 1. D. C.

INVENTORS: Without obligation. write for information explaining the steps you should take to secure a Patent. John N. Randolph. Registered Patent Attorney. 207 Columbian Bldg.. Washington 1. D. C.

"PATENT Particulars" and disclosure-evidence free. Sterling Buck. P-637 North Avenue. Baltimore 17. Md.

58 FOR INVENTORS

"INVENTOR'S Guide" free on request. Frank Ledermann. Registered Patent Attorney. 154 Nassau St., New York 7. N. Y.

THE Inventor who believes he has a new and useful invention. and needs advice. should consult a competent registered patent attorney. Without obligation. write for full information on how to secure Patents. Randolph & Beavers. Registered Patent Attorneys. 340-E Columbian Bldg., Washington 1. D. C.

INVENTORS: Avoid unnecessary expense. Write for free booklet explaining how our Consulting and Advisory Service can assist you in deriving greatest profit from inventing. Institute of American Inventors. Dept. 30-A. 1926 Eye St., N.W., Washington 6. D. C.

INVENTORS: Learn how to protect your invention. The patent laws afford inventors protection for the patentable features of their inventions. The United States Patent Office advises the inventor. unless familiar with such matters. to engage a competent. registered patent attorney or agent to represent him. We maintain a staff of registered patent attorneys ready to serve you in the handling of your patent matters. "Patent Guide" containing detailed information concerning patent protection and procedure with "Record of Invention" form will be forwarded upon request—without obligation. Clarence A. O'Brien & Harvey Jacobson. Registered Patent Attorneys. 82A-A District National Building. Washington. D. C.

INVENTORS—Send today for "Detailed Patent Information" outlining preliminary steps to be taken toward Patent Protection. also convenient "Evidence of Invention" form. Victor J. Evans & Co., 342-B Merlin Bldg.. Washington 6. D. C.

FREE service to inventors with inventions for sale. U. S. Industrial Research Committee. 23 Nelson Ave.. Staten Island 8. N. Y.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

INVENTORS — Patent Laws encourage the development of inventions. The Rules of Practice of the U. S. Patent Office advises—unless an inventor is familiar with such matters—that he employ a competent registered attorney or registered agent, as the value of patents depends largely upon the skillful preparation of the specifications and claims. Write for further particulars as to patent protection and procedure and "Invention Record" form at once. No obligation. McMorrow, Berman & Davidson, Registered Patent Attorneys, 143-T Victor Building, Washington 1, D. C.

CASH For your idea. 280 manufacturers need inventions, patented or unpatented. List free. Invention Bureau, 208 Clinton, Oak Park, Illinois.

INVENTORS: If you have an invention for sale, patented or unpatented write Institute of American Inventors, Dept. 30A, 1926 Eye St. N.W., Washington 6, D. C.

HIGHEST Royalties and cash for inventions when we market them. Free booklet without obligation. Universal Marketing Co., 126 Lexington Ave., New York 16, N. Y.

INVENTORS: The usual First Step is to have a search of the U.S. Patents conducted, so I can report on Patentability. Write, without obligation, Patrick D. Beavers (Formerly Randolph & Beavers) Registered Patent Atty., 939 Columbian Bldg., Washington (1), D. C.

INVENTORS: Without obligation, write for information explaining the steps you should take to secure a Patent on your invention. John N. Randolph, Registered Patent Attorney, 206 Columbian Bldg., Washington 1, D. C.

PATENT searches—reliable, efficient, air mail service—$6.00. Write for free invention protection form. Patent Research Service, 703 Albee Bldg., Washington 5, D. C.

INVENTION Record, Patent application and search forms plus invention sales data free. Charles Morton, 11 West 42nd Street, New York.

INVENTIONS Wanted—For development. Elo Development Company, 29-28 41st Avenue, L. I. City, N. Y. IR 6-6219.

PROTECT Ideas inexpensively. Write Counselor Birsh, 712 Manhattan Ave., Brooklyn.

TEXAS farm boy—$5,000.00 cash obtained for my first patent. Send $2.00 for information how sale was made and my rights protected. Kirk Knight, RR, Bartlett, Texas.

75 INVENTIONS WANTED

INVENTORS: Hundreds of manufacturers have requested our assistance in locating marketable new products. Complete information, free. Institute of American Inventors, Dept. 30C, 1926 Eye St., N.W., Washington 6, D. C.

PATENTED, unpatented inventions wanted. We have tremendous lists of manufacturers who may pay cash, royalties. Descriptive booklet free. National Invention Service, 1404-B Mitchell Street, Oakland 1, Calif.

INVENTORS! Have you good patentable ideas? Write Patent Agent Metzleer, 11 West 42nd, New York.

INVENTIONS Promoted. Patented or unpatented. Write Adam Fisher Company, 183-A Enright, St. Louis, Mo.

INVENTORS — Booklet "Self-Testing Your Patent Or Invention" free on request. Avoid costly mistakes, wrong markets. Direct Contracts, 11106-B2 Longwood, Chicago 45.

SMALL Inventions wanted by manufacturers. I'll help you sell your invention. Write for circular. S. Hull, 7829 Euclid, Cleveland, Ohio.

82 MANUFACTURING

SMALL lot production. Aluminum castings; Stampings; Screw Machine. J and M Company, Burlington 2, Kentucky.

MODELS small lot manufacturing, metals, plastics, etc., Millburn, Burlington, Ky.

87 MODELS, MODEL SUPPLIES

SHIP model catalog 25c coin. Roy Hancock, 323 Douglas Ave., Portsmouth, Va.

MOST complete Illustrated Catalog—"O-HO OO" Model Railroad Parts ever published. Send 5c for mailing. Selly, 1377 Gates Ave., Dept. 836, Brooklyn, N. Y.

MODEL Ship Builders! Are you looking for authentic, precision ship models? Send for richly illustrated fully descriptive catalogue in full color of famous ships of all kinds. Only 25c. Halesite Yacht Service Inc., Dept. C-38, Halesite, Long Island, N. Y.

SHIP and Yacht model fittings; blueprints. Send 25c for illustrated catalog No. 20—Listing hundreds of items. A. J. Fisher, 1002-2 Etowah Ave., Royal Oak, Mich.

BUILD Model Ships, Railroads, Catalog 10c. Ideal, 21 West 18th Street, New York 11, N. Y.

SHIP model kits and fittings, most complete stock in New England, of Boucher, Fisher, Marine Model, Model Shipways. Fittings, plans, tools, model yacht equipment. Illustrated catalog 25c coin. James Bliss & Co., Inc., Dept. M 220 State Street, Boston, Mass.

SHIP Model and yacht supplies, complete large 64 page catalogue, 30c. Wm. Wild, 510 E. 11th St., New York City.

SHIPMODEL kits and fittings of authentic design and detail. Model kits include brigs, fisherman, cutter, clipper. New catalog, 15c. Model Shipways, Folio 40, 476 Main St., Fort Lee, N. J.

POWER Models—steam and gasoline engines, steam traction engine, metals, tools. Catalog 35c. Charles Cole, Ventura, Calif.

HOBBYIST'S Catalogs! Controlog-engine powered, line control model planes, 100 kit photos, construction, flying instructions—10c. Send large self-addressed stamped envelope for free folder featuring famous English Twin Trix 3-rail trains. 164 page Ship Model Kit-Fittings Catalog—35c. Booklog—hundreds of model, hobby, craft books—10c. Send coin, stamps. Polk's Hobbies, "World's leading hobby house", 314(PS) Fifth Avenue, N. Y. 1.

STEAM engines—boilers—castings. Catalog 25c. Anton Bohaboy, 2297 Price, Rahway, New Jersey.

RAILWAY models, complete line. Combined HO and O gauge, catalogue, 50c. Walthers, 269 Erie, Milwaukee 2, Wisc.

BRASS Gears and model supplies for the inventors. Send 10c for catalog. Pierce Model Works, Tinley Park, Ill.

TT gauge model railroads. Operating layout on a tabletop. Send for free illustrated folders. John Boyle Sons, 102 S. Wyoming St., Hazelton, Penna.

SHIP models, copper sails, Blinker light house, book ends. Construction sets. Catalogue 25 cents. Trade Wind Models, Box 171A, Lakewood, N. J.

71 HOME CRAFTSMEN

TEXAS ebony, America's most beautiful lathe turning wood. Large piece, $1.00 Prepaid. Sample, dime. Information on Southern Woods, Stamp. Starcraft 2, Edingburg, Texas.

LEATHER-Crafters: Free 1948 catalog showing easily completed projects, full line of tools, hides and accessories. Ester Leather Co., 145 St. Paul St., Rochester 4, N. Y.

LEATHERCRAFT. Pleasant, profitable. Easily learned. Send card for free booklet. Artcraft Leather of California, Dept. PS-2, 271 Twelfth Street, Oakland 7, California.

DO your own professional felt flock finishing. Complete kit includes flock, undercoat, thinner, spray gun and instructions. $9.25 post paid. Write for free color card and circular. Berott-Ross, Dept. 1 B, 411 N. Foothill Road, Beverly Hills, Calif.

SHELL Jewelry Supplies — Wholesale only. McFarland Plastic Co., Sarasota, Fla.

COPPER Strips, cold rolled, .025 ins. thick. Assortment 5 sizes, 1, 2, 3, and 6 inch widths, 12 inch lengths, $1.90. 24 inch lengths, $3.75 Postpaid. Groundmaster Company, Boulder, Colorado.

SPECIAL Offer: 80 full size toy, novelty and lawn ornament patterns only $1.00. Lynds, Medway, Mass.

CELLULOID—New postwar, beautiful assortment. Mottles, opaques, onyx, pearls. Used by ring makers everywhere. One pound assortment—pieces approximately 30 sq. in. each. Price $1.00. Please add 10c for postage. Craft Service, 337 University Avenue, Rochester 7, New York.

SILK SCREEN Process. Start a profitable business or an absorbing hobby. Make colorful posters, cards, personalized stationery. Professionally decorate wood, metal, plastic toys, novelties. Outfit complete with simplified instructions $4.50. Newell Novelties, 15 Scotland Rd., Cauaudaigua, N. Y.

FREE folder—"Amazing new service." Materials furnished to build projects featured in this magazine. Project Headquarters, 1756B Henderson, Chicago 13, Ill.

HUNDREDS Full size patterns:—Easily made plywood novelty furniture for jig and band-sawing, lawn ornaments, plaques, frames, silhouettes, letters, numerals, weathervanes, toys. 150 Crafts-Hobby books and booklets, hundreds decal transfers. Catalog and folders illustrates 465 articles, 25c. (No stamps please) refunded first order. Wo-Met Shop, Box 167, Ashburn, Georgia.

LEATHERCRAFT! Complete stocks of leathers, tools, supplies. Immediate shipment. Free catalog. Kit Kraft, Dept. PS2, 3203 W. Washington Blvd., Los Angeles 16, Calif.

LEATHERCRAFTERS! Belt kits, projects, leather, supplies. Free catalog. Arts Leather, 411 Joseph Ave., Rochester 5, N. Y.

SPECIAL 77 Full Sized Patterns, Lawn Ornaments, Toys and Novelties. $1.00. Modern Woodcraft, Saginaw, Mich.

18 BLUEPRINTS AND PLANS

"BLUEPRINT Reading Made Easy"—ready reference book for reading any type blueprint. 596 pages, 463 pictures. Formerly $8.95, now only $1.98. Popular Science, Dept. 28-C, 353 4th Ave., New York 10, N.Y.

23 BUILD IT YOURSELF

BUILT-In Kitchen cabinets—$1.00 brings detailed plans and specifications showing construction methods. Will fit any kitchen. Thombert Co., Box 447, Newton, Iowa.

HOT water free—from sunlight. System efficient any locality year round. Standard materials—easily built—low cost—facts free. Solar Water Co., Box 175, Dept. G, Coral Gables, Florida.

"PREFABRICATED Homes". 38 page How to Build picturebook. $1.00. Nelson Frissell, Civil Engineer, Gardner 94, Mass.

ENJOY soft water. Simple, easy, plans, instructions $1.00. Huff Industries, 10230 San Carlos, South Gate, Calif.

BUILD concrete block machines, portable sawmills. Shop, farm, home machines. 70 plans. Catalog-Handbook Free. Nichols Equipment Co., Dept. 604, Purvis, Miss.

SPECIAL. Full size patterns make over 100 toys. $1.00. Complete plans for over 20 modern kitchen cabinets. $1.00. Free list. Masterprint, White Building, Buffalo 2, N. Y.

"BUILD Cabins"—book offers complete instructions and plans for building your own cabin, lodge, tourist home, or wayside stand. 256 Pages, 200 plans and pictures. Only $1.98. Popular Science, Dept. 28-C, 353 4th Ave., New York 10, N. Y.

"CONCRETE Block Homes". 32 page booklet: drawings, instructions on how to build. $1.00. H. C. Lightfoot, Civil Engineer, Richboro, Penna.

GAS range $30. Book and plans $4. Literature free. Ensco, Box 73B, Pasadena 16, California.

FREE Booklet—"How to Build and Equip a Chemical Laboratory." Sanco, Box 613, St. Louis, Mo.

PLAYHOUSES & doghouses, scientifically designed. Plans and material list for 4 sizes of either $1.00 postpaid. C. Miller & Wutkee, 253 Conant Hotel, Omaha, Nebr.

BARBECUE Oven—Build it yourself in your own back yard with parts and instructions furnished. Write for free information. Bar-B-Kit, 4723 Troost, Kansas City, Mo.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

139 WATCH REPAIRING

WATCH and clockmakers Handbook—Britten $5.79. Free catalog. Engineers' Book Service, 19 W. 44th St., New York City 18.

WATCH and clock repairing increasing, complete home study course with drawings and pictures. Information free. Houston Chronometer and Watch Co., P.O. Box 1140B Houston 12, Texas.

95 OLD GOLD, WATCHES, ETC.

GOLD $35.00 Ounce—Mail old gold teeth, diamonds, jewelry, watches—receive cash by return mail. Satisfaction guaranteed. Free information. Dr. Weisberg's Gold Refining Company, 1500-B Hennepin, Minneapolis, Minn.

CHALET Watches—wholesale. Illustrated catalog. Free. Foreign inquiries invited. John Green-B, 210 Fifth Ave., New York 10.

WATCHES, wholesale. Rebuilt-like-new Elgins, Walthams, Bulovas, etc., $9.75 up. Catalogue free. Brookins, B-1975V, Little Rock, Ark.

76 JEWELRY

JEWELRY Findings. Lowest Prices. George Sassen, 154 Nassau Street, New York 7.

CERAMIC Jewelry Supplies, Bar Pins, ear screws, for ceramic and woodworkers, also, glass and sea shell assemblers. Free catalog. Philadelphia Badge Co., 1007 Filbert St., Philadelphia, Pa. Dept. E-1.

IMITATION miniatures for jewelry and novelty makers. Look like genuine. Sample with setting, 15c. Also chain, filigree stampings, etc. Trinity, 2498—65th St., Brooklyn 4, N. Y.

MANUFACTURE costume jewelry at home for profit, hobby, therapy. Free wholesale supply catalogue. Instructions. Florida Supply House, Bradenton, Florida.

MAKE shell costume jewelry at home. Complete supplies Kits. Catalog. See Display. Tropical Shell-Art, 2 North Third Avenue, Mt. Vernon, N. Y.

132 TOBACCO & PIPES

PIPE Carving kits 75c. Seconds $5.00 pipes 65c. Literature free. Carvapipe, 2829A Dixie, Hamilton, Ohio.

113 RAZOR BLADES, SHAVERS

DOUBLE your shaves from your Schick Injector Blades by simply turning them or get from twenty to forty shaves by stropping them inside a drinking glass. Simple as inserting a new blade. Send 50c piece and your name for Gold Plated (Pat. Pend.) tool for removing and inserting blades, and simple instructions. Weeks Valve Company, 225 W. 34th St., New York City.

PRECISION steel razor blades. Unusual buy. Sample free. Service, 1332R Findlay, N. Y. C. 56.

86 MISCELLANEOUS

FIREWORKS: Don't be disappointed. Get Famous Banner Fireworks with all the newest and startling effects. Giant Cannon Salutes that rock you like a crash of thunder. Whistling Devils with weird unearthly noises. Skyrockets that burst in majestic colorful display. Gasp in amazement as you watch the "Battle In The Clouds". Genuine Chinese Firecrackers. Over 200 pieces including Sparklers for the little tots. Retail value over $11.25 for Only $4.95. Rush order today. Any quantity. Send money order, bank draft or currency, no C.O.D.'s. Banner Fireworks Mfg. Co. Inc., Dept. 111, 446 Capistrano, Toledo 12, Ohio.

MEN! Large Size Shoes, large size sox! We specialize in large sizes to 16, widths AA-EEE. Oxfords, hitops, work shoes. Guaranteed extra quality. Free catalog. Kingsize, 468 Brockton 10, Mass.

PHONOGRAPH Records. Latest hits. Popular and Hillbilly. Shipped anywhere. Standard prices. Order your favorites now. Free catalog on request. Mailorc, Dept. 15, 570 N. Gay, Balto. 2, Md.

RAISE ginseng, roots bring fortunes, illustrated circular free. Fezler Seed Co., Patchogue, N. Y.

HULL automobile compass, value $4.95, brand new, $2.50. Prisms for 6 x 30 or 8 x 30 Binoculars, brand new, $1.50 each. Offset prisms to be attached to 7 x 50 B. & L. Binoculars, gives double the field of the ordinary 7 x 50 Binocular. Cost $98.00, special $25.00. Green sunshades for Binoculars, size 6 x 30 and 7 x 50, snap on type, value $7.50, special $1.25 per pair. Forward money order. No C. O. D. shipments. Send coin $1.25 for Third Annual Edition of Gun Digest together with our complete catalog of new and used guns, ammunition, rifles, binoculars and powder flasks. Our separate Catalog 25c. Public Sport Shops, 11 S. 16th Street, Philadelphia, Pa.

BOOKFINDERS! (Scarce, out-of-print, unusual books). Quickly supplied. Send wants. Clifton Company, Box 1377 PSM, Beverly Hills, Calif.

GOLFERS: I will inform you about fault in Swing that causes you to Slice, pull, or shank. Send $1.00 and Stamped addressed Envelope to Alex Miller, Former Pro, East Bradenton, Florida, Route 2, Peaches Court.

TEPPEE Novelty Shop, Ipsunich, So. Dak., Box 236, has beautiful Indian tepee lamp shades in bright colors, designs, Sparkling glass finish. Details free.

SENSATIONAL miracle art fotos, instantly developed with plain water. 20 different $1.00, 4 samples 25c. Modern Products, Box 2, Knickerbocker, New York 2.

SENSATIONAL! Adult photographs, complete selection! Sample and literature 10c. Miller Photo Service, Box 5152, Pittsburgh, Pennsylvania.

MAKE your own printing cuts. New, easy plastoplate process. Plastoservice, Argyle 2, Wisconsin.

PIN-Up-Girls! The real McCoy! 5—$1.00. Hollycraft Specialties, Box 17—Station D-PS, Los Angeles, Calif.

FREE literature how to locate buried treasure and minerals. Fisher Laboratory, Inc., Palo Alto, Calif.

GUNNERS Training Table—New—The greatest value offered yet—Ideal for clubs—shooting galleries—automatic checking—counting—burglar alarms—can be operated as a very profitable business—comes complete with 7 AC—110Volt motors—sensitive Electric Eye—Powerful Amplifier—Rotating mechanism—maple top table—etc. All parts can be used individually—worth the investment for parts and mechanism alone—Limited time $250. "Amazing Bachman's," 25 Herman Street, Rochester 5, N. Y.

INQUIRE Now about our Home Plan Service for 24' x 26' x 30' one floor, two bed room homes. Write today for particulars. Columbia Small Home Plan Service, Dept. 50, 1570 Hawthorne Park, Columbus 3, Ohio.

LOVELY Pin-Up Girls, Real, Actual Photographs. 10 for $1.00. Sixty different $5.00. M. Wilkins, 417 Hill, London, Canada.

ART Photos! Sample 50c. 3 for $1.00. Post Office Box 2011, Phoenix, Arizona.

HYPNOTIZE! Control the minds and actions of others! Completely illustrated course $1.00. Money Back guarantee. Fowler, Box 1284, Boston 4, Mass.

GET Lots Of Mail: Name Listed Three Directories 25c. Harvey Teeple, Decatur, Ind.

GOLD—$70 an ounce possible soon. Free booklet on panning gold, instruction book-supplies. Old Prospector, B-84, Dutch Flat, Calif.

THREAD restorers, renew damaged threads, literature. Bowers Hardware, Sta. A 175P, Canton, Ohio.

PIN-UP photos—professional models. 24 actual glossy photographs $1.00. Special Offer Six different sets (144 photos) $5.00 postpaid. Irving Klaw, Dept. SS, 212 East 14 St., New York City 3.

138 WANTED MISCELLANEOUS

MERCURY—Highest prices. Free Containers. Write Mercury Terminal, Norwood, Mass.

57 FOR THE HOME

NEW revolutionary translucent house numbers. Visible at night. 25c each figure. Agents wanted. R. Whitefield, 257 Maple Ave., North Hills, Pa.

INSULATE your home yourself. Old or new. Plans, instructions, illustrations, $1. Moneyback Guarantee. Insulation, 616 B S. Liberty, Alliance, Ohio.

101 PERSONAL

HOW You Can Find Out! Information discreetly developed. Any matter, person, problem, anywhere. Personal-Business assignments, representations undertaken. Nationwide. Officially licensed, bonded service. Established 1922. Reasonable. Confidential. William Herman, 170 Broadway, New York.

BORROW by mail. Loans $50.00 to $300.00 to employed men and women. Easy, quick. Completely private, confidential. No endorsers. Repay in convenient, monthly payments. Details free in plain envelope. Write State Finance Co., 320 Securities Bldg., Dept. B-14, Des Moines 9, Iowa.

BEAR Oil—Best treatment for baldness. You never saw a bald headed Indian. They use it. We can supply you with the genuine product. One dollar prepaid. Swastika Drug Co. Limited, Swastika, Ontario.

VIEWS Of The Hereafter. For copy of the remarkable book by Emanuel Swedenborg "Heaven and it's Wonders and Hell" send 5c to cover mailing. Swedenborg Foundation, Room 1648, 51 East 42nd St., New York 17, N. Y.

REALIZING Prosperity — Metaphysical book. Attract success. $2.00. Wetzel Publishing S., Los Angeles 13, Calif.

MATRIMONIAL—Sweetheart Magazine, 50c. 6 mos. $1.00, Yr. $2.00. Barwood, 2037-E 42nd, Astoria, N. Y.

INFORMATION for single people by Human Relations Consultant. University Graduate. Dr. B. Long, Box 375, Los Angeles 53, Calif.

ALCOHOLISM is a Disease amenable to our treatment. If this evil threatens your home, job or business, Do Something Now! Write for Free Folder. Established 50 Years. The Murray Institute, 620 S. Tenth St., Minneapolis.

ART, scenic photo 35c, 4 $1.00. Color slide 50c, 3 $1.00. Originals Novelty Supply, 1227 East Van Buren, Phoenix, Arizona, Dept. D.

HAIR Falling? Dandruff? Write Trichologist, 139 Lewis Street, Phillipsburg, N. J.

THICKER, more masculine hair for men. All about latest secrets, discoveries free. Write immediately. Henry Bruns, Dept. S, 3307 Fremont, Madison 4, Wis.

STOP Tobacco—Quit cigarettes pleasantly, permanently. Best formula science knows. Guaranteed harmless. Enclose $1.00 for booklet. Scientific instruction. Psychogenic Science, Dept. A, Box 402, Canton 1, Ohio.

WRITE a letter for publication in my "friendly" magazine. Subscription $1.00. Let me help you personally with all your problems. Jack Wilcox, Problem Editor, G.P.O., Box 112-P, New York 1, N. Y.

RUPTURED? Positive comfort, no understraps, no steel, no elastic. Write Smith Manufacturing Co., Preston, Ontario.

TRUTH About Mind Power! 20 Years research. Startling, concise, authentic. Amazing results! Complete $1.00. Saunders, 1345 Holly Ave., Holly Hill, Florida.

"LENT—Easter customs," 25c. Bulletin, Box 87, Cathedral Station, New York 25.

LONELY—? Sealed details "dime" (Your age?) List $1.00, 3—$2.00. Painter, Box (PS), 966 Akron 9, Ohio.

BUY Vitamins Direct. Amazing Savings. Money Back Guarantee. Our 9th year! Postcard. Matoska Products, White Bear Lake, Minn.

Copyrighted material

POPULAR SCIENCE OPPORTUNITIES

2 ADVERTISING

INCH Display Advertisement Mail-order World. year $24. Wood's Popular Services, Atlantic City, New Jersey.

ADVERTISING sensation! Reach 2,200,000 families—$28.00 inch. Helpful ratebook (Newspapers, Magazines, Mailing Lists), advertising assistance—free. Chicago Advertising Agency, 20-PS West Jackson, Chicago 4.

MAIL Order Advtg. with a profit guarantee. 20 years experience. Write for Special Free Offer. Azrael Advtg. Agency, 1000 N. Chas. St., Balto. 1. Md.

24 WORDS in 64 Weeklies $4.96. J. Darnell, 730 Hays, Jackson, Tenn.

ADVERTISE: 24 words, 40 newspapers $3.50. Lists free. Advertising Bureau, 229-P, Dixon, Uniontown, Pa.

50,000 READERS. 25 words 2 months $3.00. Renick, Holland 3, New York.

130 TAXIDERMY

FINEST Glass Eyes; Taxidermy Supplies. Catalog Free. Elwood Company, Dept. 235, Omaha 2, Nebraska.

45 DRAFTING INSTRUMENTS

SAVE on drafting materials. Free catalog. Draftsmen's Supply Co., 32 North Wells, Chicago 6

NEW drawing sets, Dietzgen, Precision, etc. Write for free literature. Tilbury's, 1223 West Warner, Guthrie, Oklahoma.

129 TATTOOING SUPPLIES

TATTOOING Outfits, Supplies. Illustrated List Free. Zeis, 728 Lesley, Rockford, Ill.

27 A CANDY MAKING

MEN-Women—"Most Everybody Likes Candy." Learn to manufacture Professionally at home. (Our 38th year.) Ragsdale Candies, East Orange, N. J.

MEN, Women; Start Candy Kitchen at home; Big profit; Free booklet. Thompson Co., Baldwin, Michigan.

142 WOODS

BUSINESS cards of real wood. Write Cards of Wood, Manlius 2, N. Y.

27 CAMPING

ARMY tents, canvas, clothing, paint. Dept. P, Jarashow, 10-19 Jackson, Long Island City 1, N. Y.

81 A MAGNETS

ALNICO Magnet—Lifts Ten Pounds! $1.00. Catalog 3c. Ronald Eyrich, Box 849, Milwaukee 1.

TWELVE Alnicov Magnets, 100 experiments, $3.00. Experiments, 25c. Disc Magnet, $1.00. Eljay, Box 891, Newark 1, N. J.

ALNICO magnets. Free list. Terry Sales Company, 3726 South Detroit Av., Toledo 9, Ohio.

134 TREASURE FINDERS

METAL Detectors. The Very Latest Circuit. Free Literature. Hedden Metal Detectors, 538 North Homewood Avenue, Pittsburgh 8, Penna.

TREASURE Hunters! Radically new Goldak locators. New featherweight Model 101 weighs only 11 pounds! Revolutionizes location of Gold, Silver and Minerals. Money-back guaranteed superior any other. Write The Goldak Co., 1544 W. Glenoaks, Glendale 1, Calif.

M-SCOPE Metal Locator fully guaranteed and unsurpassed in efficiency. New featherweight models. Time payment plan. Free literature. Fisher Research Laboratory, Inc., Palo Alto, Calif.

42 DETECTIVES

DETECTIVE Training. Phillips Secret Service, 1917C, N. Kenneth, Chicago 39, Ill.

DETECTIVES—Work home—Travel. Experience unnecessary. Write Wagoner P-125 West 86th, N. Y., N. Y.

89 MONUMENTS

BUY a monument or sell them for us. Agents wanted everywhere. Big catalog Free. Marble-Granite Factory, Oneco 50, Florida.

74 INFORMATION

20 PRACTICAL Art Tips 15c. W. Clair, 44 Linden Avenue, Lansdowne, Penna

93 NAME LISTS

MAILING lists; most classes, 1000 $5.00. Free Prospectus. Dixie Service, King, N. C.

84 MILITARY INSIGNIA

FREE—3 Military Emblems, with Catalog 10c. Hobbyguild, X35 West 32, N. Y.

USE THIS ORDER FORM TO INCREASE YOUR MAIL ORDER BUSINESS

LOOK AT THESE LOW RATES

70c Per Word, Per Insertion
WHITE SPACE—$4.00 Per Line.
Minimum Ad—10 Words—$7.00
CASH WITH ORDER

If You Sell A Product or Service To Men, Use This Easy Means To Get More Sales

CLASSIFIED ADVERTISING ORDER

Popular Science Monthly • 353 Fourth Avenue • New York

Please insert the ad below in your.....issue.
Heading.....
Enclosed is $..... Word Count.....
.....
.....
.....
EACH WORD IN NAME AND ADDRESS MUST BE COUNTED AS A WORD
Name.....
Address.....City & State.....

To be inserted in the April issue, this order must reach us by Feb. 26th

Copyrighted material

"OWN a Business" Coupon

DURACLEAN CO.
Division of HOME SERVICE CO.
18-2 CT Deerfield, Illinois

With no obligation to me, send booklet and letter giving full details. Tell me how I may OWN a growing business of my own built upon satisfied customers.

Name.....

Address.....

City.....State.....

Are You The Man?

If you are dependable, honest and willing to work to own a large-profit, lifetime business and become financially independent, we invite you to mail the above coupon for full details. We are now enlarging this 17-year-old, nation-wide chain of **individually-owned** CERTIFIED Service businesses. We'll establish you in YOUR OWN business and help finance you. You use successful methods of established **Duraclean** dealers. This is a sound, steady, lifetime business. Dealer gross profits (above materials and labor) are up to $20 for a day's service on **EACH** of his service men. **Easy to learn . . quickly established.**

Revive, Clean and Protect Upholstery and Rugs

Duracleaning restores the natural fibre lubrication of wool and other animal fibers. Resiliency returns to the pile. It rises again. Brilliant colors revive. Results in many instances are almost unbelievable.

Duraclean banishes the need of cleaning upholstery, rugs and carpeting by harsh machine scrubbing and soaking. It eliminates harmful Solvents and strong soaps.

The aerated foam, created by the **patented** electric Foamovator, cleans by ABSORPTION—not by scrubbing. Dirt, grease and many unsightly spots vanish. **Duraclean** is recommended nationally by America's foremost furniture and department stores.

Duraproof Immunizes against moths, beetles

The patent protected **Duraproof** service not only kills moths and carpet-beetles but is WARRANTED to make fabrics **non-eatable** to both. The U. S. Government says, **"Moths are present in practically every household . . . No section of the country seems free from such infestations."** Damage to household goods and wearing apparel is greater from moths than from fire. **Duraproof** DEFINITELY PROTECTS rugs, carpets, upholstery, furs, clothing, blankets, piano-felts, auto interiors. Protects against mildew too.

Dealer Comments:

R. Kimbrough: "Finished First White House of Confederacy and am to Duraclean the Governor's Mansion."

P. Wilson: "My business comes from recommendations of satisfied customers."

O. D. Heffelbower: "People who have seen the work have expressed amazement."

Q. Corbett (Canada): "Several hundred dollars in jobs lined up from canvassing."

S. Edsall: "Have 5 women's clubs interested in the work."

H. T. Satterfield: "We Duracleaned a chair for the largest department store and got an order for 60 to 75 chairs, couches and davenports."

E. Schalchlin: "Have on hand 5 orders totaling over $500.00 . . obtained from recommendations of customers."

F. R. Jones: "Your offer is the best and most amazing I've ever had."

No Shop Needed — EASY to Learn

No overhead expense. Both services may be rendered in homes, offices, hotels, theaters, institutions, etc., by your service men. Auto dealers have upholstery **Duracleaned** in used cars. Foamovator converts to carrying case. Some establish shops or an office—others operate from their homes.

Start Part or Full Time

No experience needed. We show you 18 ways to get customers. Almost **every building** in your territory houses a potential customer. There is a waiting market in small and large towns alike.

Duraclean and Duraproof are year-around services for which there is always a constant need. Free booklet and our first letter explains everything. Just mail coupon.

Repeat and Voluntary Orders

Demonstrations win new customers. Men in this business find REPEAT and VOLUNTARY orders become a major source of income. Customers are not merely satisfied—many are enthused at results and tell friends and neighbors.

Double Profits

You enjoy large profits on both materials and labor, after paying service-men and salesmen. At the start, you may want to render **Duraclean** service yourself. You have national prestige and cooperation of a national organization interested in YOUR success.

EASY TERMS:

A moderate payment establishes **your own** business—pay balance from profits. We furnish electric machines, folders, store-cards, introduction slips, sales portfolio, demonstrators and enough materials to return your TOTAL investment. You can have your business operating **in a very few days.** Just mail the coupon. No obligation.

Copyright 1947 by

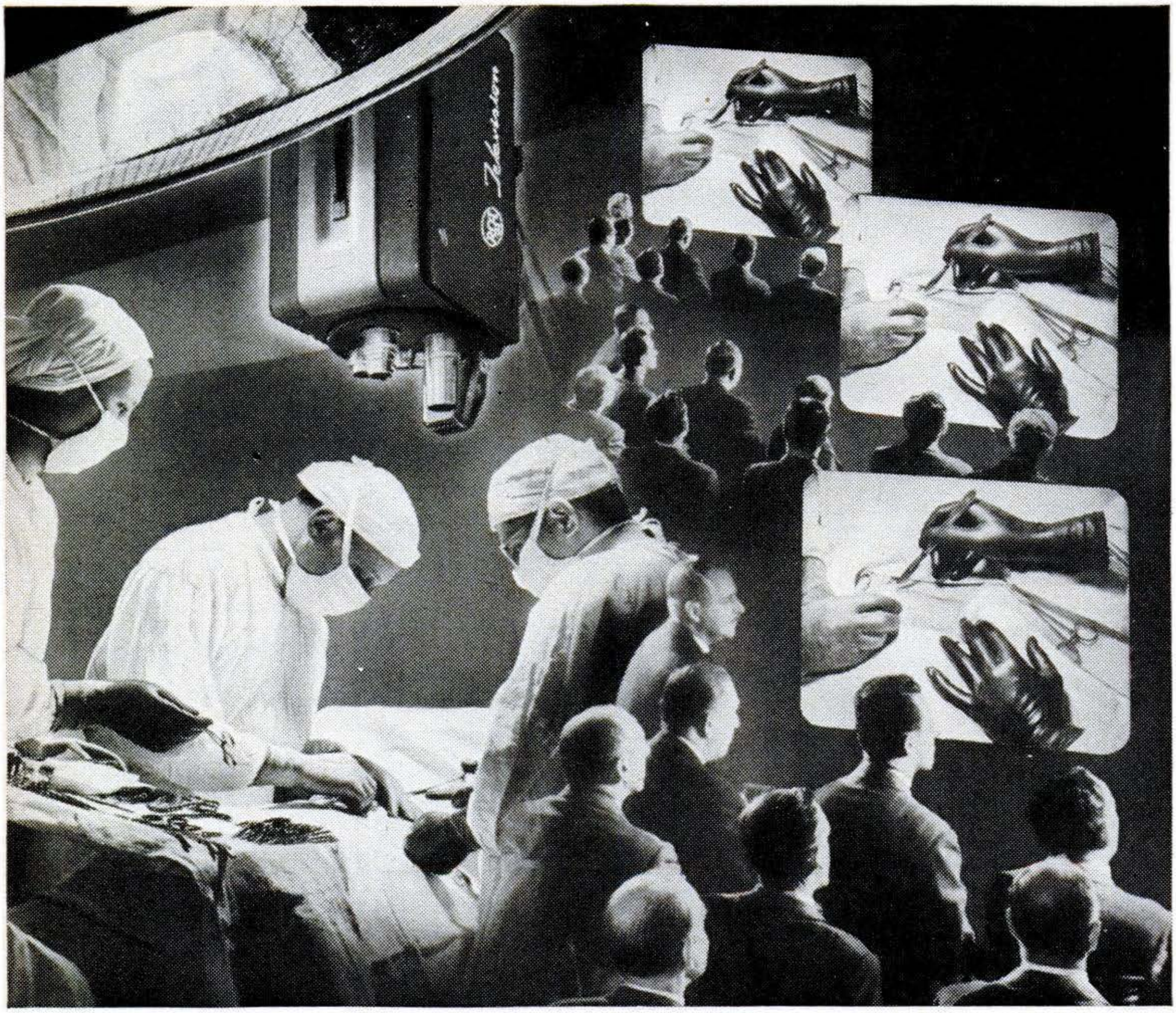
DURACLEAN CO, 18-2 CT, Deerfield, Illinois

FREE Booklet

Our first letter and 16 page illustrated booklet will explain everything — these modern urgently needed services, the waiting market, how business grows, your large profits, easy terms and protected territory.

Send for It— Mail Coupon

Copyrighted material



Successful telecasts of surgical operations show value of television to medical education.

"Step up beside the surgeon—and watch"

Not long ago, a radio beam flashed across the New York sky—and "carried" 7000 surgeons into an operating room...

Impossible? It was done by television, when RCA demonstrated—to a congress of surgeons—how effective this medium can be in teaching surgery.

In a New York hospital, above an operating table, a supersensitive RCA Image Orthicon television camera televised a series of operations. Lighting was normal. Images were transmitted on a narrow, line-of-sight beam . . . As the pictures were seen the operating surgeons explained their techniques . . .

The beam was picked up at a midtown hotel—carried to RCA Victor television receivers. And on the video screens, visiting surgeons followed each step of surgical procedure. Action was sharp and clear. Each surgeon was as "close-up" as if he were actually beside the operating table.

Said a prominent surgeon: "Television as a way of teaching surgery surpasses anything we have ever had . . . I never imagined it could be so effective until I actually saw it . . ."

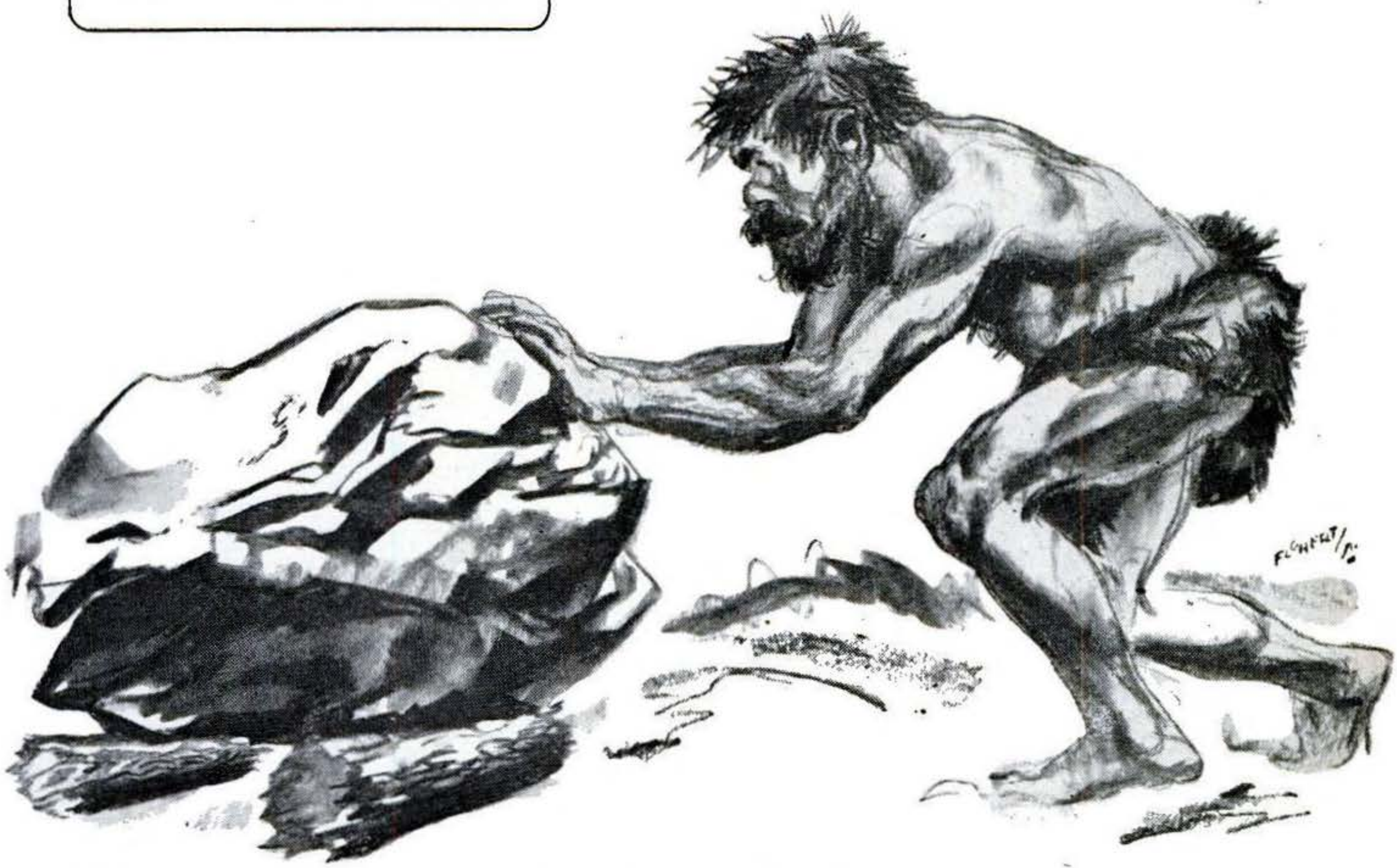
Use of television in many fields—and surgical education is only one—grows from advanced scientific thinking at RCA Laboratories. Progressive research is part of every instrument bearing the names RCA or RCA Victor.

When in Radio City, New York, be sure to see the radio and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. *Radio Corporation of America, RCA Building, Radio City, New York 20, N.Y.*

RADIO CORPORATION of AMERICA

Copyrighted material

PS
The Voice of Science



The First Scientist Was a Good Workman

NOBODY knows his name or his color or the shape of his head. But everybody knows what he did: he used his head to save his back.

Perhaps he was alone and had hurt his back. Maybe there was some special urgency, like a strong smell of tiger. There must have been some good reason why he tried thinking. Because thinking was harder than sweating. It still is.

Anyway, there he was with a rock and a reason and an idea. Maybe he got the idea originally when a round stick rolled under his foot. The important thing is that he dared to try something brand new. That's what made him a scientist. And he was a good workman because he didn't shirk the hard part: whacking and rubbing the bumps off the log to make it roll.

Every scientist, whether he measures the power of a fly's leg or fits something he can't see into figures, is always a good workman. And every good workman is a part-time scientist whenever he thinks his way around a tough nut instead of just batting it one.

Next time you turn a corner in a car or hear a train rumble through, remember the gent in the fur pants who dreamed up the roller under the rock. He did a lot for you: he invented the wheel, brother!

Perry Githerings

Copyrighted material

he's going places... he's got P.A.*

* means Pipe Appeal

Pipe Appeal is that distinctly masculine appearance of the man who smokes a pipe! Thousands of men fill their pipes with Prince Albert Smoking Tobacco!

means Prince Albert

R. J. Reynolds Tob. Co., Winston-Salem, N. C.

• Prince Albert is the largest-selling pipe tobacco in America. Its choice tobacco is rich tasting ... mild and easy on the tongue. P. A. is crimp cut—specially treated to insure against tongue bite. Try Prince Albert!

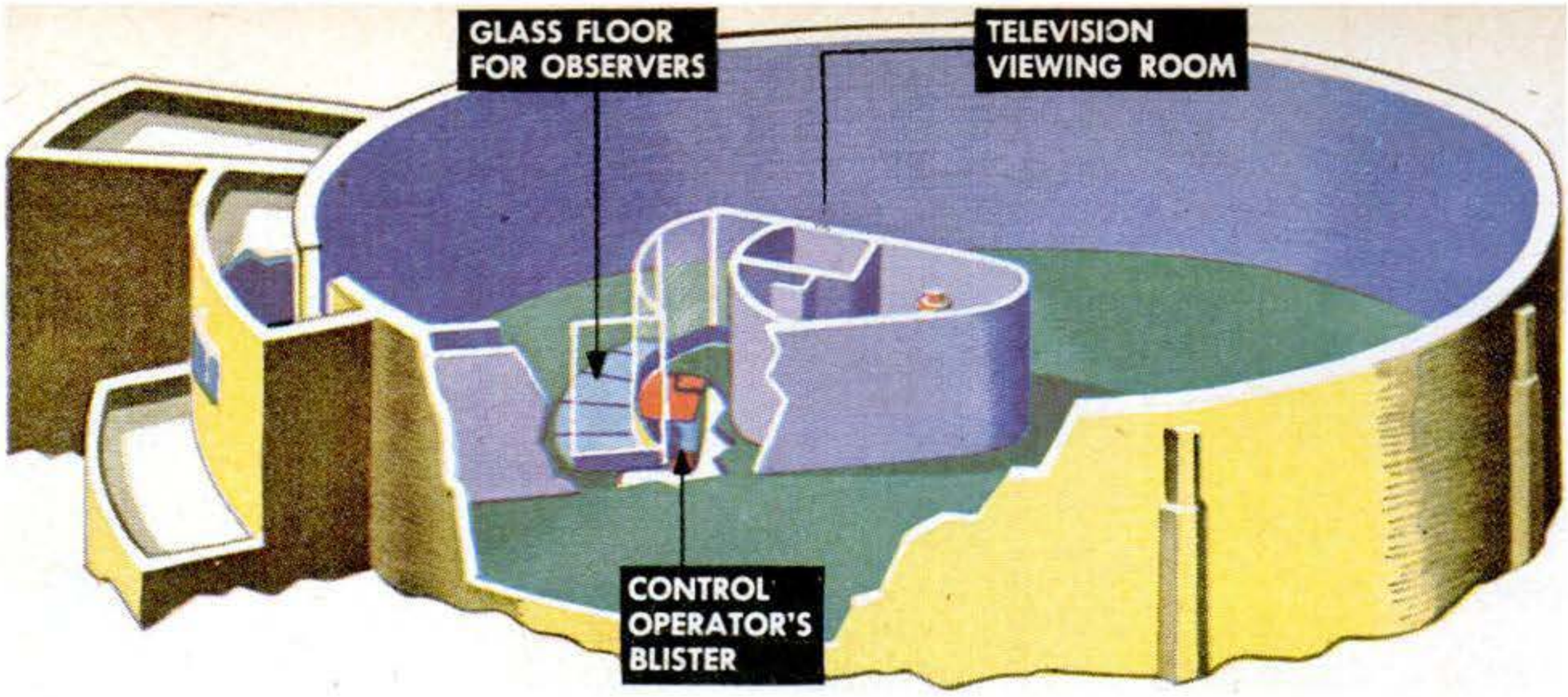
THE NATIONAL JOY SMOKE

Copyrighted material

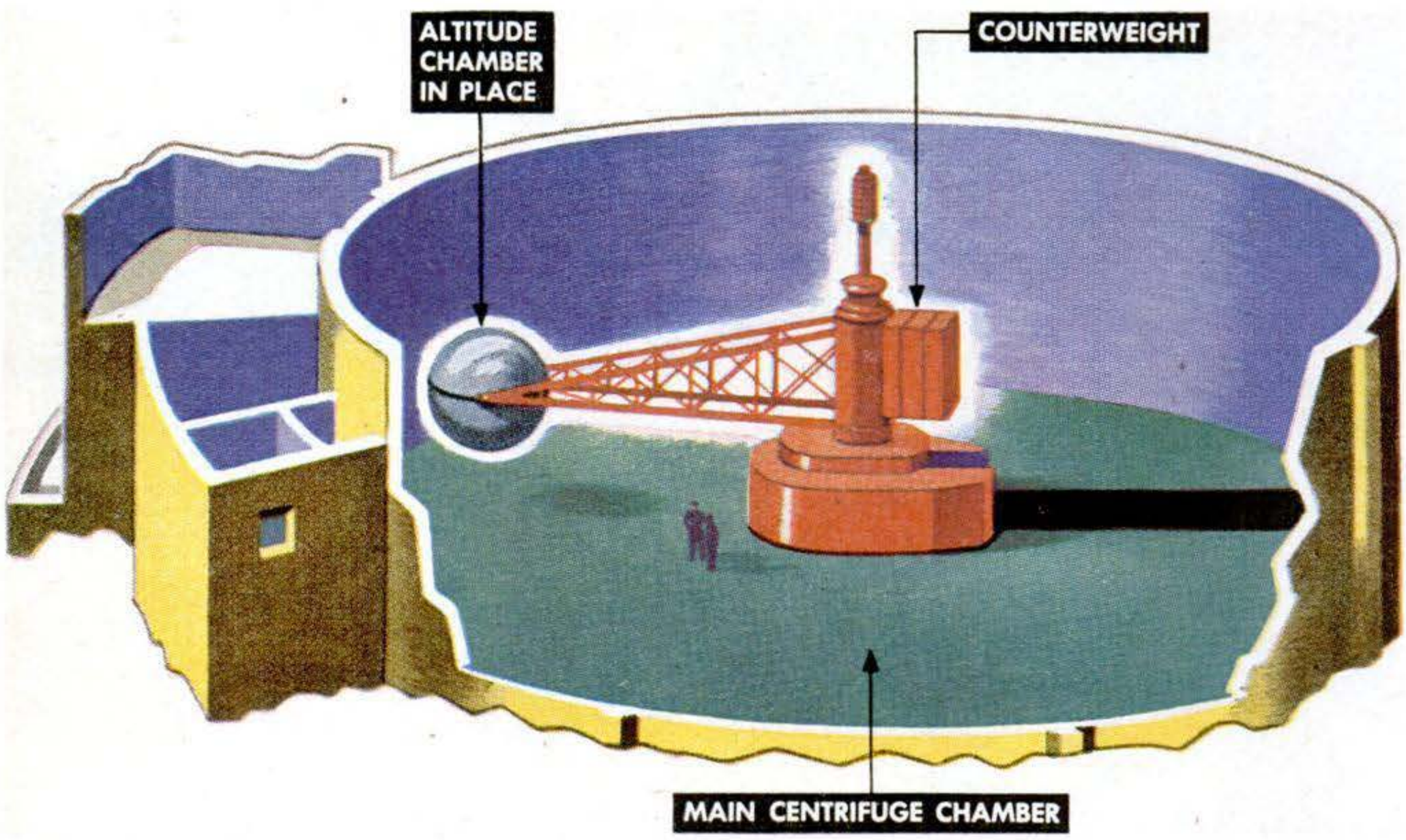
Ready for the Big Squeeze . . .

This hollow mass of rubber is on the receiving end of a 69-foot-high hydraulic ramrod. When pressure is put on, the rubber will bulge out into the doughnut shape of a giant tire for earth-moving tractors used in building highways and airports. These massive tires have 140 times as much rubber as those of the average passenger car, and weigh more than most automobiles. Hose dangling from top of this Firestone press connects with a "curing bag" used to shape tire.

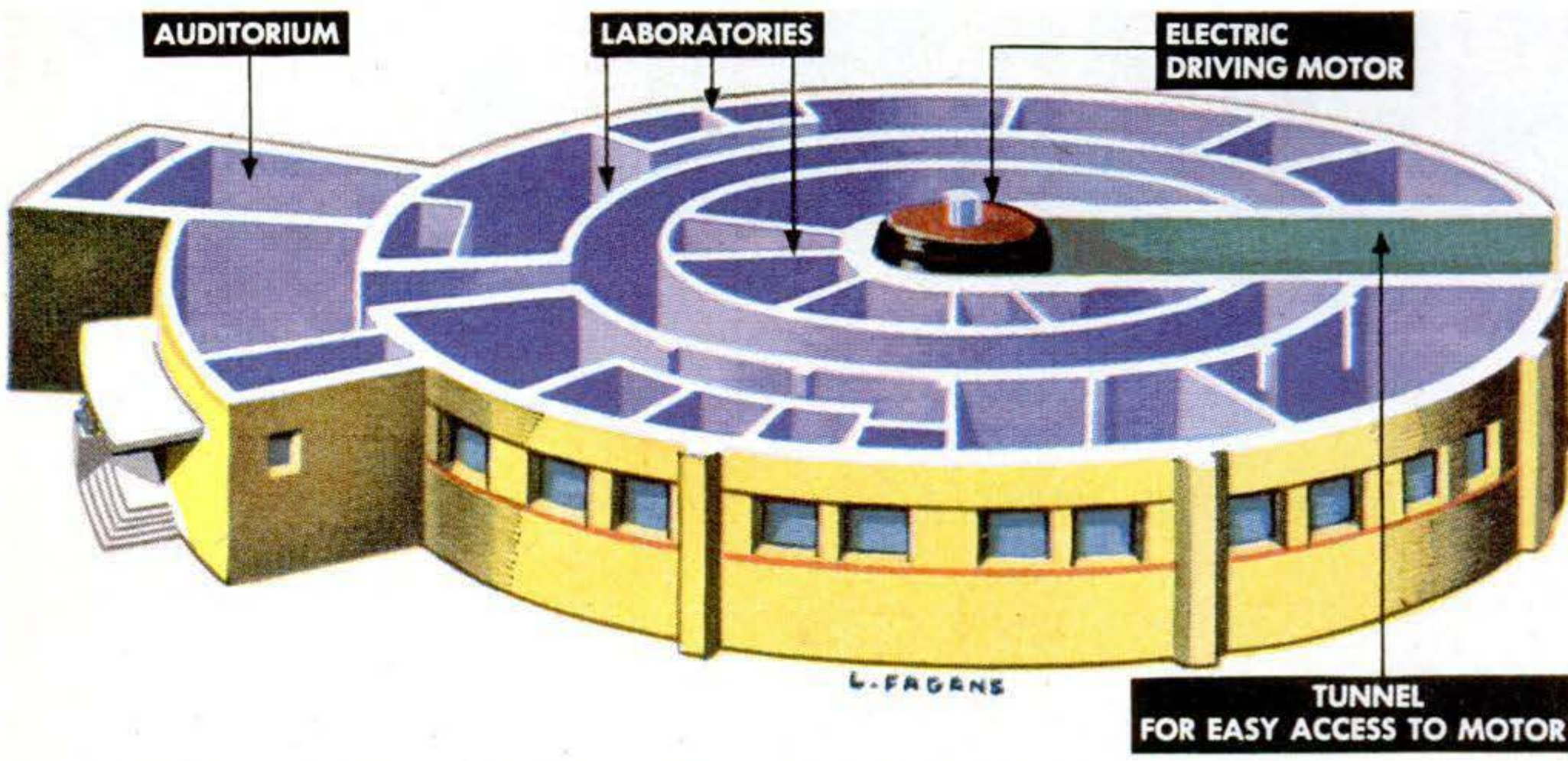
Copyrighted material



Observation facilities, television receiver, instruments, and control room are on top floor.



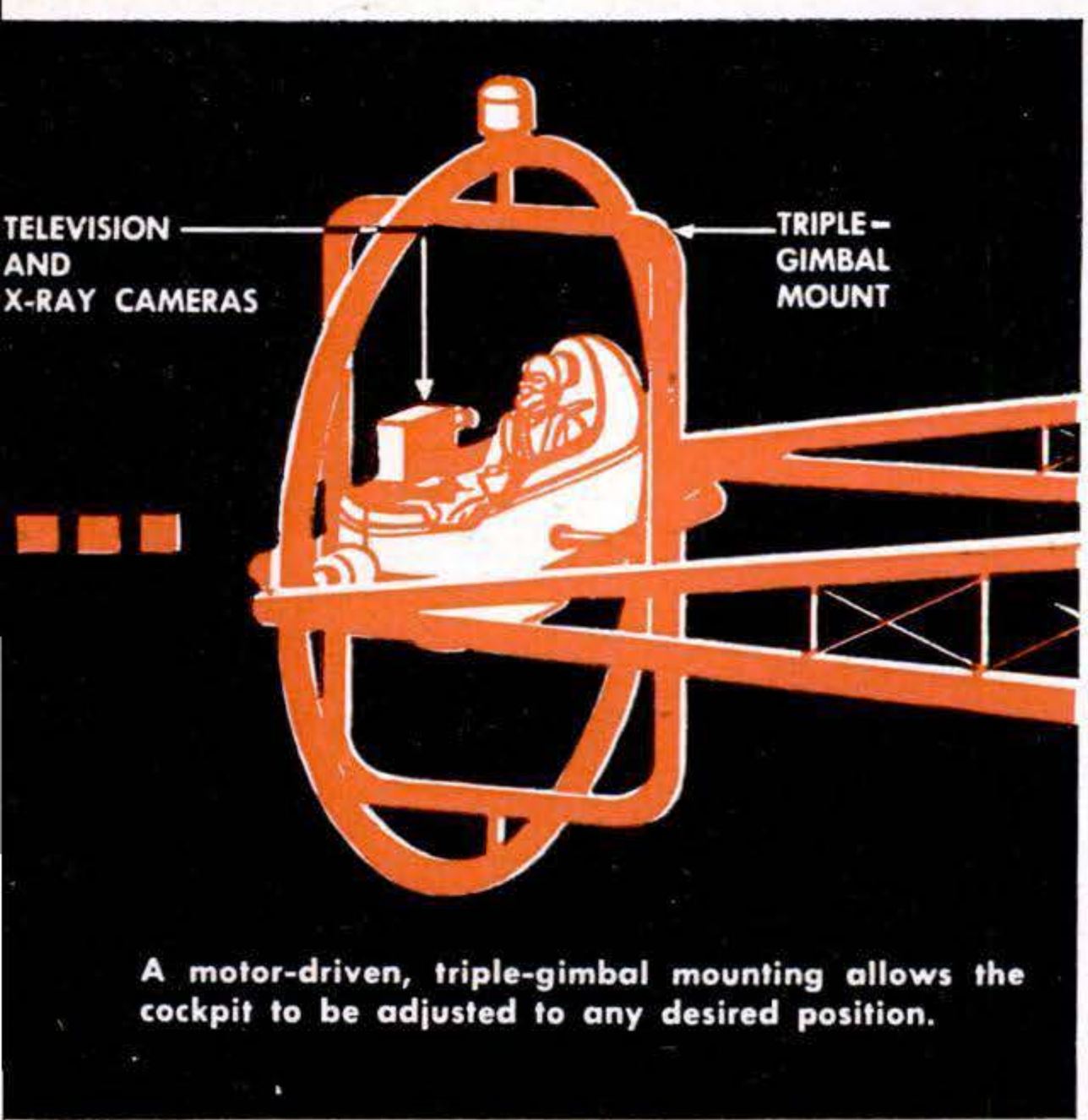
In main chamber is centrifuge with 50-ft. steel arm rotated by 145-ton, 4,000-hp. motor.



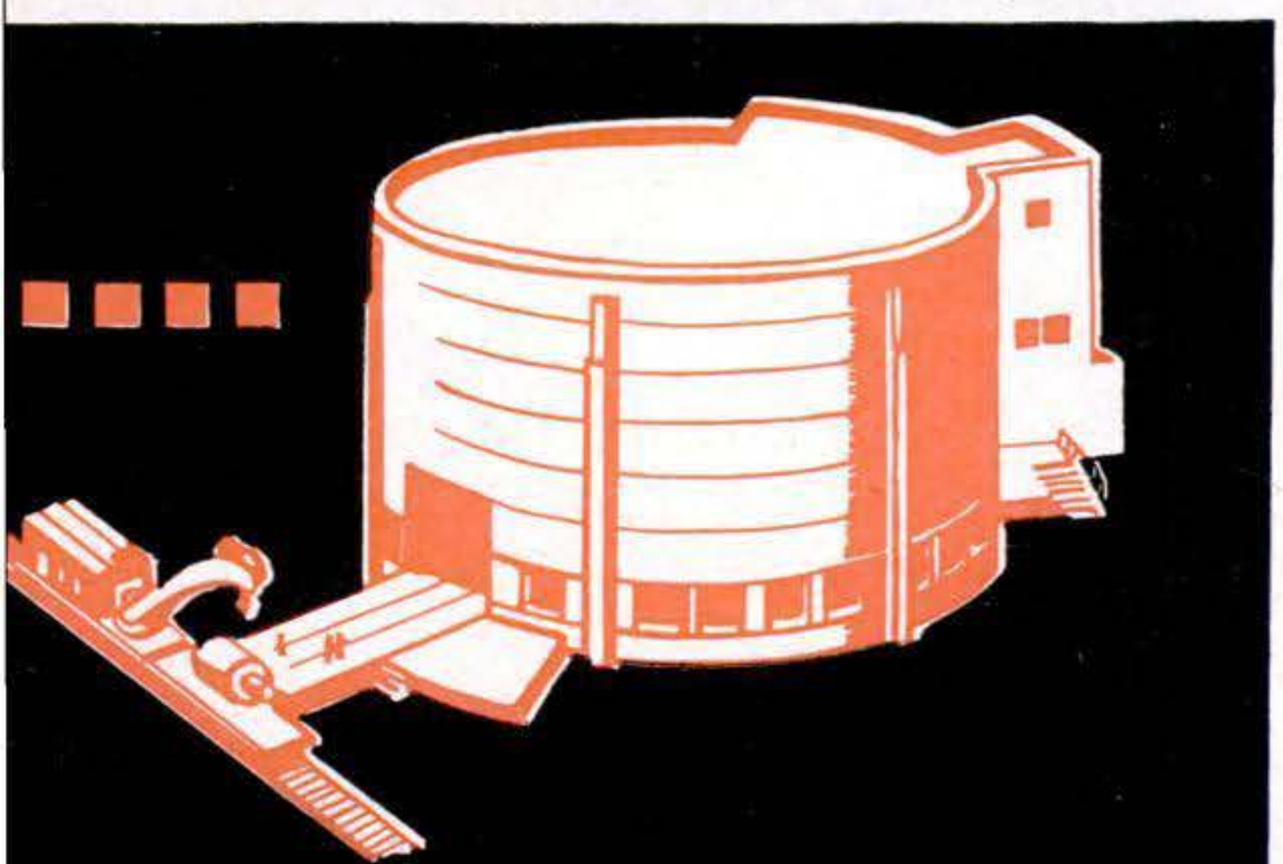
Lower floor houses laboratories that will analyze, help solve problems of supersonic flight.

Copyrighted material

On the television screen, the doctor in charge gets a continuous view of the subject during a test.



A motor-driven, triple-gimbal mounting allows the cockpit to be adjusted to any desired position.



The huge centrifuge building. A tunnel facilitates the removal of the motor for necessary repairs.

New Guns for Human Bullets

By George H. Waltz, Jr.

Drawings by Lester Fagans

TAKING an all-out ride in the Navy's newest laboratory "gun" will be like sitting astride a standard aircraft rocket as it starts toward its target. This "gun" is a human centrifuge to end all centrifuges—a giant, high-speed merry-go-round capable of making a man feel like a bullet being shot from a rifle.

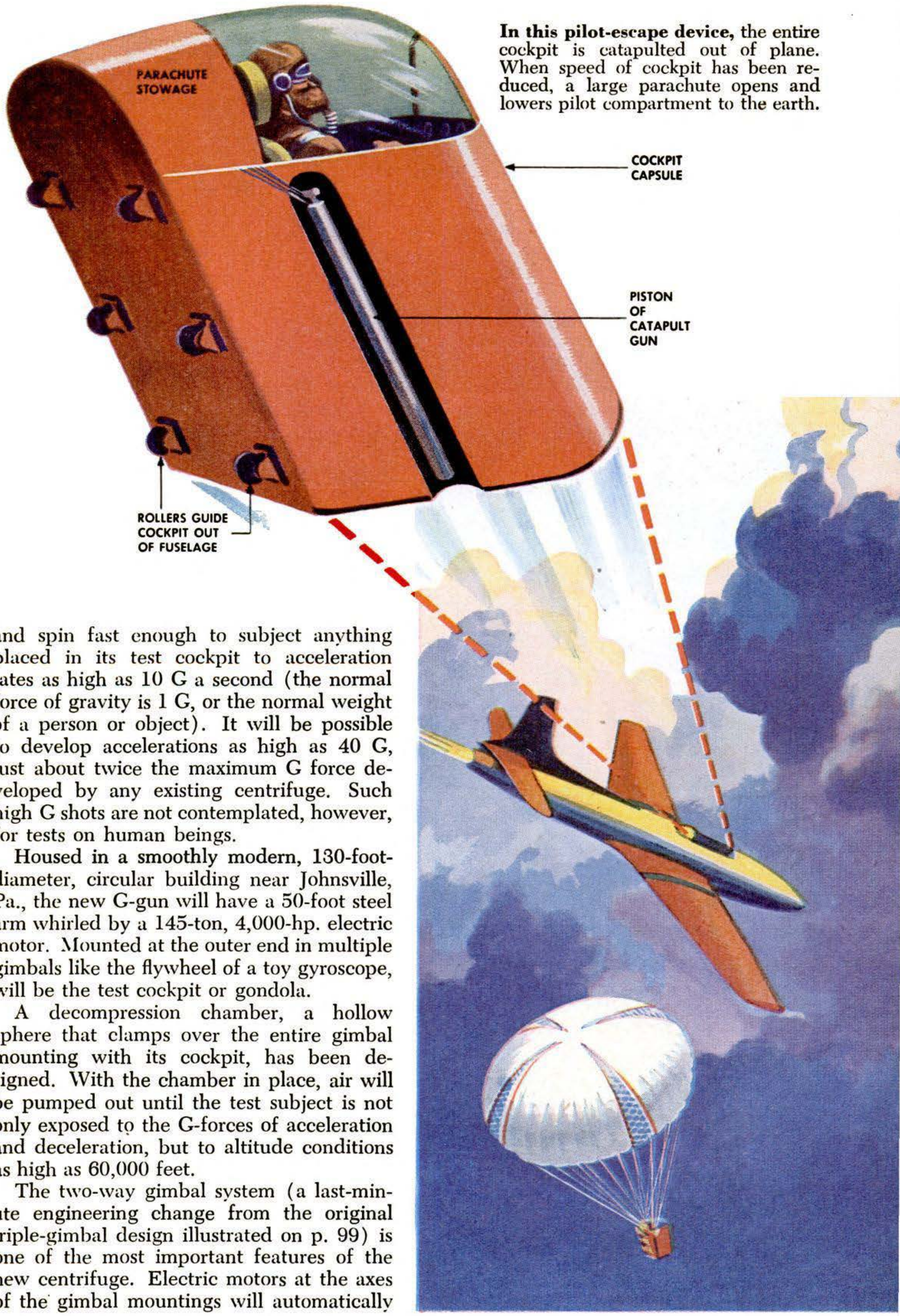
Scientists will use the machine to learn a good many new facts about the physiological and psychological effects of high speeds and sudden changes in speed. They will do it by subjecting pilots to tremendous forces of acceleration and deceleration. As pilots and airplane manufacturers strive to bore deeper and deeper into the "no man's land" of supersonic and super-supersonic flight, new problems are arising. It is not now so much a question of whether the plane will hold together as: "Will the pilot?"

What happens inside the human body when it is suddenly accelerated or decelerated? What happens if, while shooting through the air at 1,000 m.p.h., the direction is quickly changed as in a pull-out from a dive or in a sharp turn? What effects does high altitude, with its reduced oxygen, have on a pilot's ability to withstand those forces? How will airplane instruments and equipment stand up?

It is to help dig out the answers to those questions and many other supersonic puzzlers that the Special Devices Center of the Office of Naval Research is building this $2,500,000 centrifuge—the world's biggest and best equipped. It will be large enough

Copyrighted material

In this pilot-escape device, the entire cockpit is catapulted out of plane. When speed of cockpit has been reduced, a large parachute opens and lowers pilot compartment to the earth.



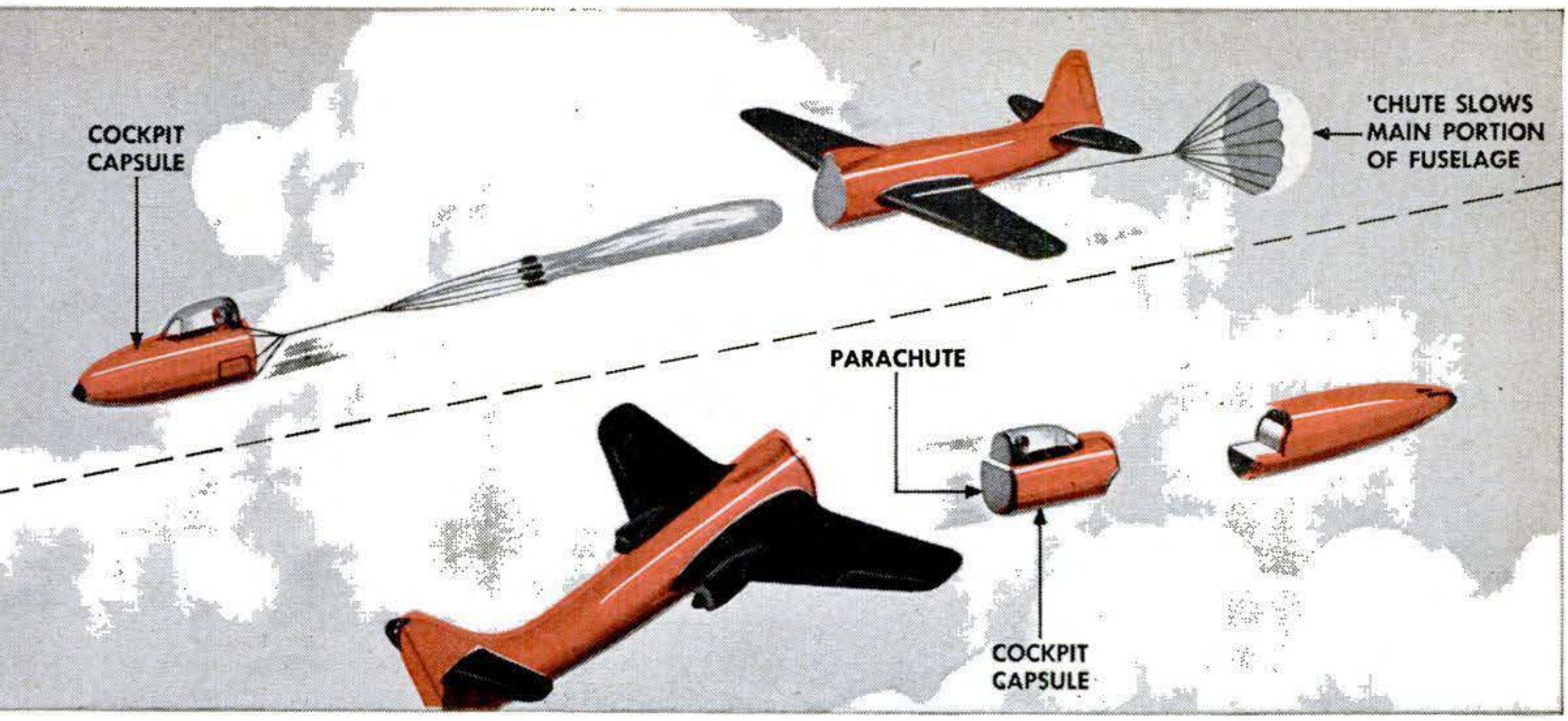
and spin fast enough to subject anything placed in its test cockpit to acceleration rates as high as 10 G a second (the normal force of gravity is 1 G, or the normal weight of a person or object). It will be possible to develop accelerations as high as 40 G, just about twice the maximum G force developed by any existing centrifuge. Such high G shots are not contemplated, however, for tests on human beings.

Housed in a smoothly modern, 130-foot-diameter, circular building near Johnsville, Pa., the new G-gun will have a 50-foot steel arm whirled by a 145-ton, 4,000-hp. electric motor. Mounted at the outer end in multiple gimbals like the flywheel of a toy gyroscope, will be the test cockpit or gondola.

A decompression chamber, a hollow sphere that clamps over the entire gimbal mounting with its cockpit, has been designed. With the chamber in place, air will be pumped out until the test subject is not only exposed to the G-forces of acceleration and deceleration, but to altitude conditions as high as 60,000 feet.

The two-way gimbal system (a last-minute engineering change from the original triple-gimbal design illustrated on p. 99) is one of the most important features of the new centrifuge. Electric motors at the axes of the gimbal mountings will automatically

Copyrighted material



Two versions of Navy's design for come-apart plane that enables pilot to escape at high speeds.

keep the test cockpit in such a position as to eliminate most of the unwanted effects of acceleration, regardless of the speed of rotation.

Seated in his observation blister hung from the ceiling, the centrifuge operator will have full control of the speed and gyrations of the test cockpit. This is made possible by the motor-operated gimbal mounting. An electronic brain will control the speed of the main motor and its giant arm with hairline accuracy. All the operator will have to do is set the controls for the accelerations he desires prior to a test run, and the electronic circuit will take care of the rest. So quick and smooth will be the action of the drive motor that the test cockpit can be shot from a standstill to its top speed of 174 m.p.h., (40 Gs) in less than seven seconds!

Television Tells Story

Observers will be able to watch the man being tested at all times through the eye of a television camera mounted in the cockpit. Automatic recordings also will be made of such things as the test subject's blood pressure, his pulse, the amount of oxygen in his blood, and his brain waves. Although the current design does not include the high-speed X-ray motion picture camera indicated in the artist's drawing on p. 99, provision has been made for its future installation; this would give observers a running record of what happens to the man's insides.

The building housing the centrifuge will be a complete aeromedical experimental station. On the main floor, directly under the centrifuge, will be a darkroom, a surgery, and physiological, clinical, and biochemical laboratories. From these laboratories may come the answers that will help beat the problems of supersonic flight.

Getting the Pilot Out

One of the problems plaguing aeromedical experts as well as supersonic plane designers, is that of getting the pilot safely out of one of these high-speed craft should it develop trouble at high altitudes. Here it is a matter of violent G forces in the form of quick deceleration. The pilot must be safely slowed down from the speed of sound to a speed that permits a safe parachute opening and descent.

Until not so long ago, a pilot with a disabled airplane on his hands simply pulled back his cockpit canopy, bailed out over the side, counted 10 to get himself safely clear of the plane, and pulled the rip cord. But when plane speeds increased materially during the war, a powder charge was provided to blow the canopy free and make the pilot's escape easier. Next, with even greater speeds, came the Navy's record-breaking, jet-propelled *Skystreak* with its detachable nose (PS., Mar. '47, p. 93) and the ejectable seat that catapults both seat and pilot out of the cockpit.

In planes flying in the transonic speed zone at high altitudes, however, neither the jettisonable nose nor the ejectable seat would be completely effective. Without some overall protection against both the sudden brick-wall impact of a 700- to 800-m.p.h. slip-

Copyrighted material

stream, and the lack of sufficient oxygen, a pilot might be badly injured, if not killed, before he could open his parachute.

One answer, Navy engineers feel, is to keep the pilot right where he is, securely strapped and braced in his cockpit, detach the whole as a unit or protective capsule from the rest of the plane, and then slow it down and lower it by means of a modified ribbon-type parachute. A ribbon parachute would be used rather than the conventional full canopy type to ease the cockpit to a slow speed instead of snapping it to a quickly decelerated stop.

In one pilot-escape device being considered by experts at the Navy Material Center in Philadelphia, the pilot of a disabled high-speed aircraft would simply hit a convenient red-knobbed button with his hand. With a loud bang, the plane's entire cockpit—complete with sealed canopy, oxygen supply, and pilot—would be shot up out of the plane. (See illustration on page 100.) Finally, after the speed of the cockpit had been reduced, a large parachute would automatically billow open and lower the cockpit to earth or to a safe altitude where the pilot could bail out and use his own 'chute.

A second design uses a jettisonable nose like the *Skystreak*, but develops the idea further. Its front or nose section also drops off, but instead of being open at the rear and merely providing a quick means of escape or bail-out, it is a closed capsule and has its own automatic parachute. A second automatically released 'chute is attached to the main portion of the fuselage and slows it down, holding it back to prevent a collision with the detached nose.

In a third version of the Navy's escape technique, a button touched by the pilot would fire explosive charges to split the airplane into three separate parts—nose, cockpit, and main fuselage with wings. Once free of the rest of the plane, the cockpit would drift to earth under its own automatically opened 'chute. As with the catapulted cockpit, the pilot could ride it to earth or bail out and use his own 'chute when he reached a safe altitude. END

Big Glass Has a Rival

IN a modest effort to "jump the gun" on the giant 200-inch telescope being installed at Palomar Observatory, Southern California amateur astronomers devised this unique open-air housing for their 21-inch 'scope. Here one of the amateurs is examining the gears of "Palomar Junior." A regular astronomical dome will come later.

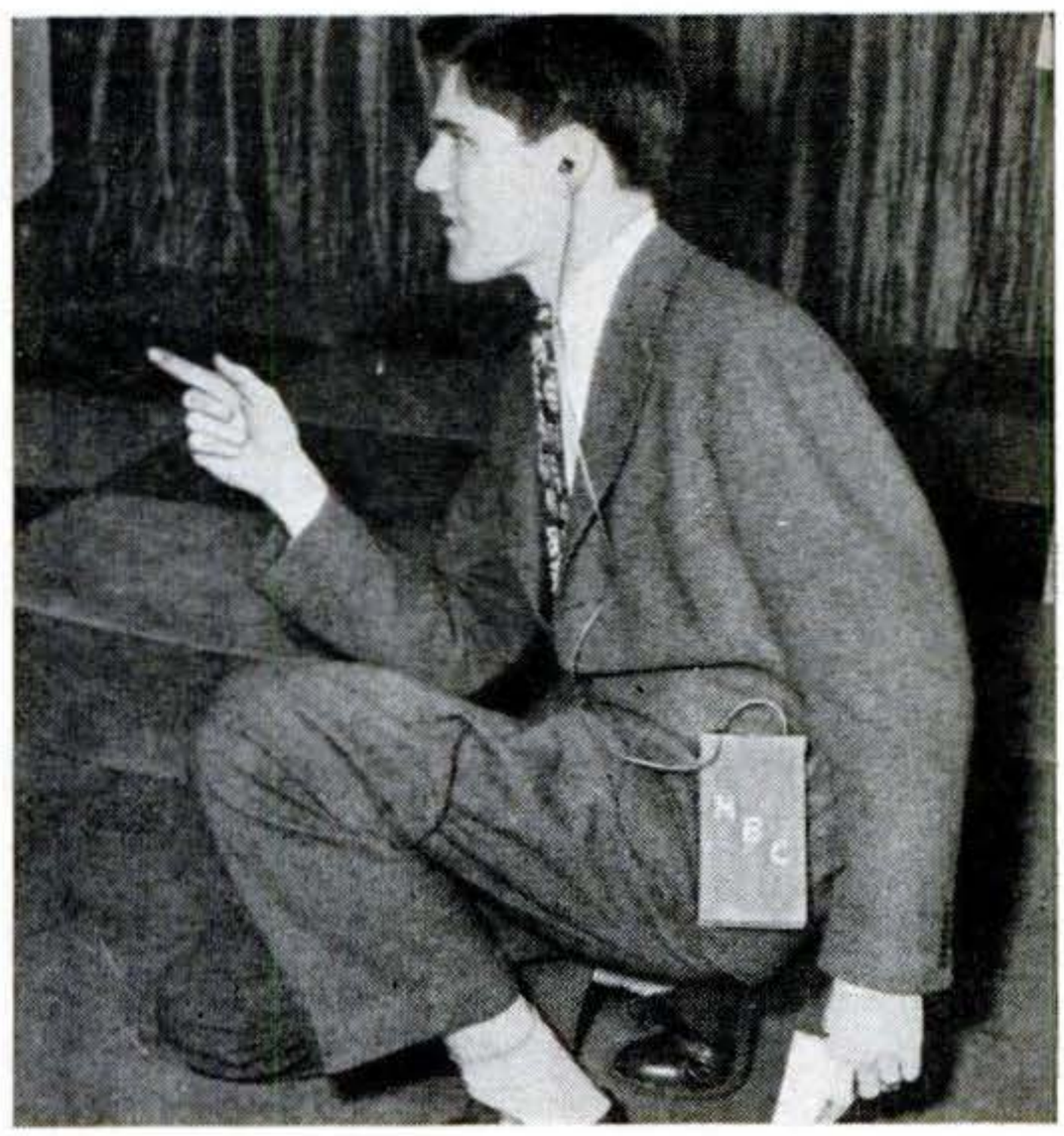
Copyrighted material

"Pocket ear" radio for receiving cues on television stage evolved from "Man from Mars" (left), and "Happy Hooligan" (center). Girl at right wears new, almost-invisible pocket ear.

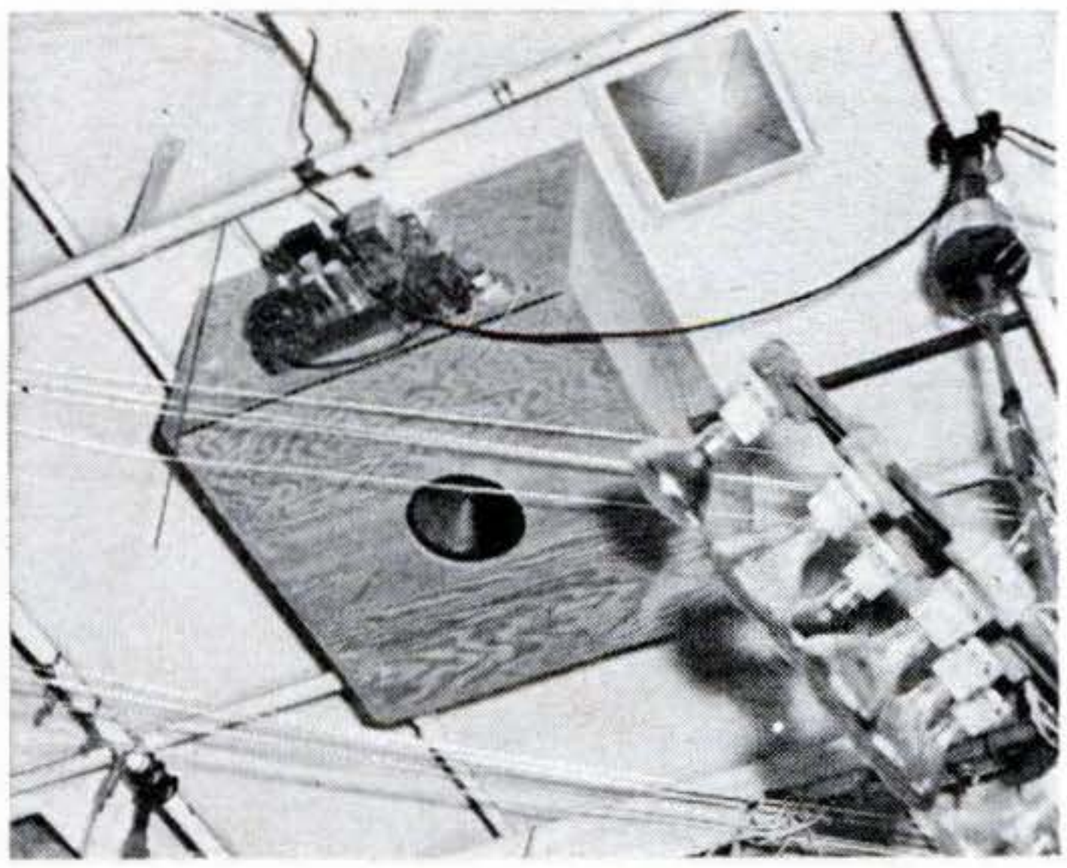
Private Radio Cues Tele Shows

TELEVISION actors and directors now get their cues over their own private radio network. In the National Broadcasting Company's New York station, WNBT, instructions from the stage manager, who sits in a soundproof booth, are broadcast on short wave and received inside the studio on small portable sets called "pocket ears."

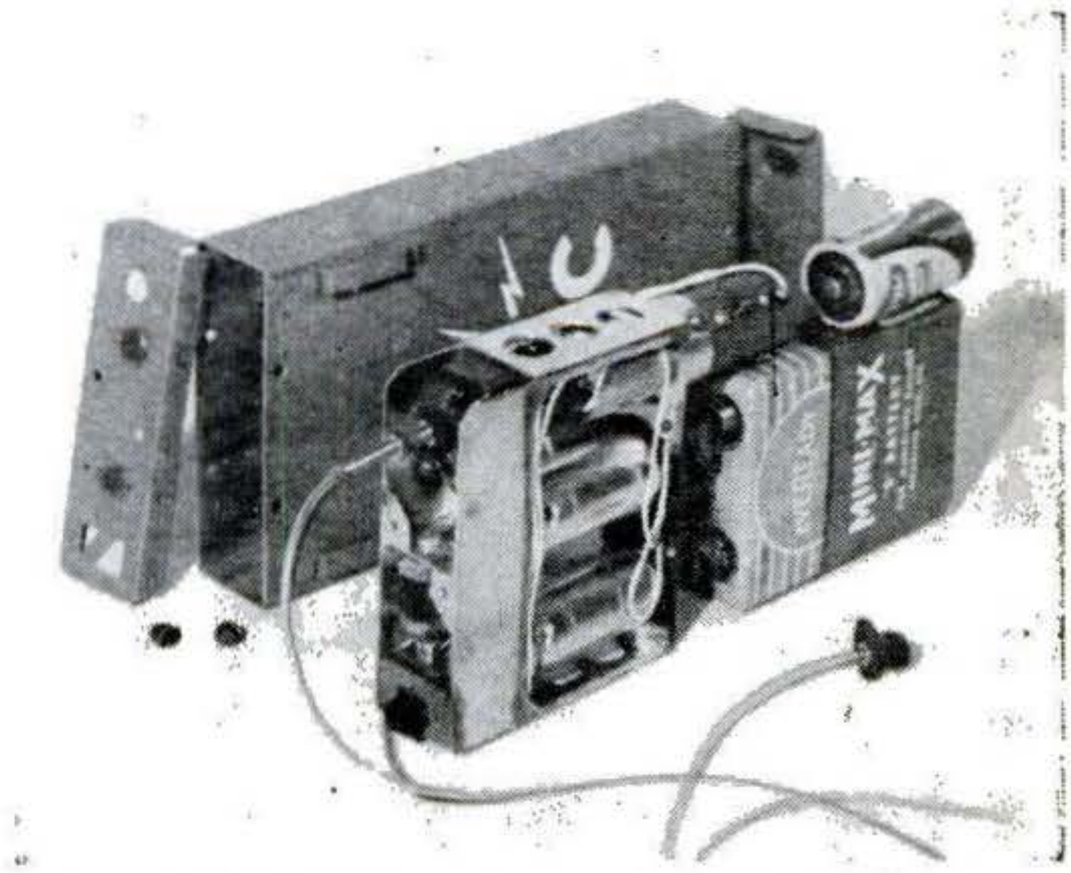
The pocket ear, developed by NBC engineers William Hotine and Lou Hathaway, is the latest in a series of lightweight radios devised to replace the old system of relaying instructions—a telephone headset connected to the control booth by a long wire. The new device is so inconspicuous it can be strapped under clothing and worn by actors before the television camera.



WNBT television director gets instructions from control booth over receiver strapped around his waist. Before advent of radio system, he had to drag long telephone wire behind him.

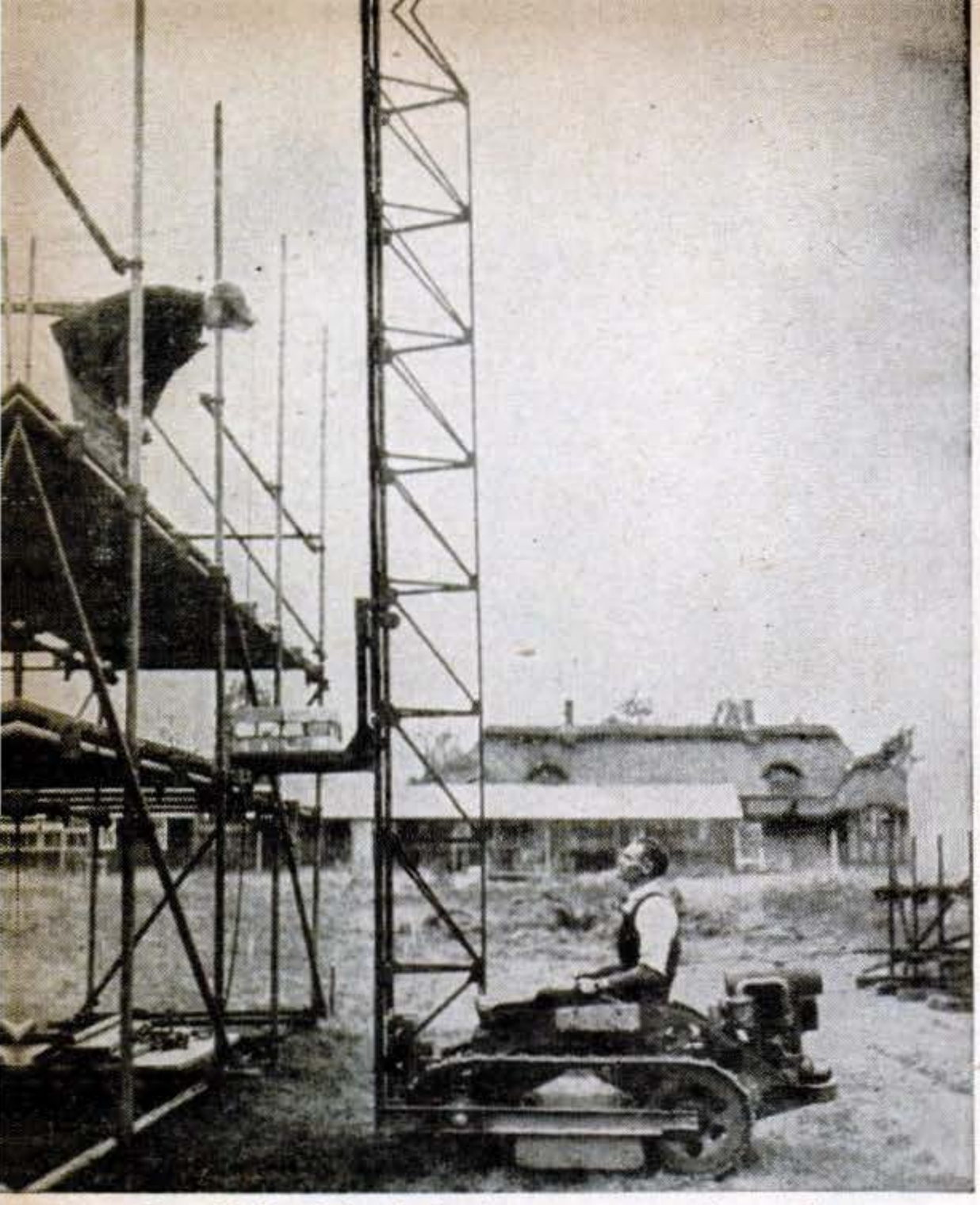


Transmitter for pocket ears is a small set on side of a wooden box fastened to studio ceiling. The box houses a public-address-system loudspeaker for issuing instructions during rehearsals.



Disassembled view shows tubes and batteries of pocket ear. Instead of usual earphone, it uses an ear plug. Sound travels from receiver to plug over air-filled channel in a hollow plastic tube.

Copyrighted material



Small builder's hoist consists of an aluminum-alloy mast and winch. In a few minutes, two men can attach it to the little six-horsepower tractor, developed from a farm tractor.

This barrow for carrying bricks is self-clamping. In the photograph above, the laborer is operating a lever that enables him to pick up a stack of 40 bricks at one time.

New Machines, Methods Help Rebuild Britain

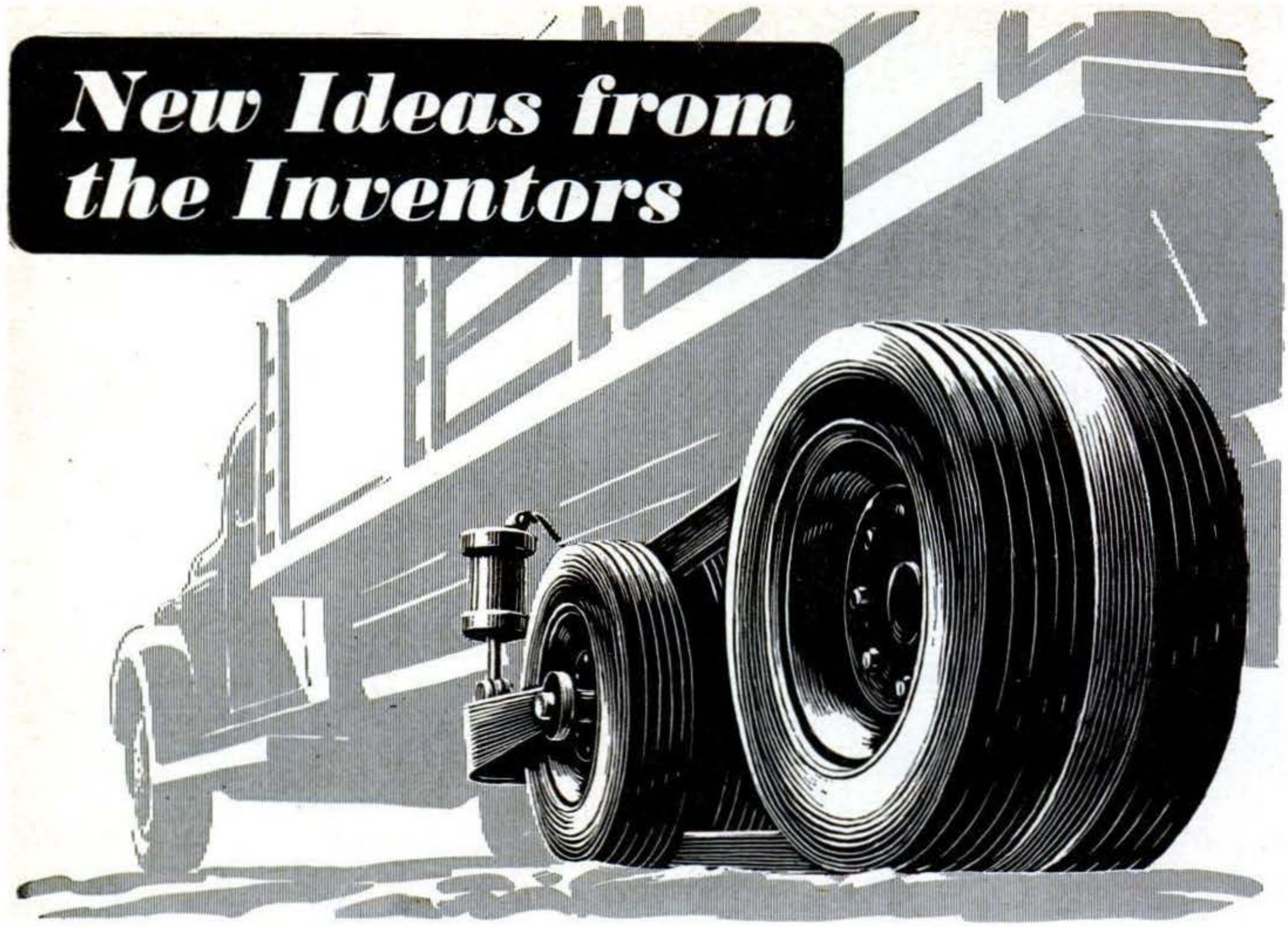
The multipurpose tractor, shown at top of page with hoist, is used here with other attachments—a bottom-discharge concrete skip at one end, a small 'dozer blade at the other.

This general purpose transport barrow for builders has a seven-cubic-foot capacity for such loads as concrete, bricks, or dirt. The little carrier is powered by a small gasoline engine and controlled by the operator as he walks with it. Above, it is being tipped to discharge its load. To reverse the barrow, the whole power unit is rotated about its axis.

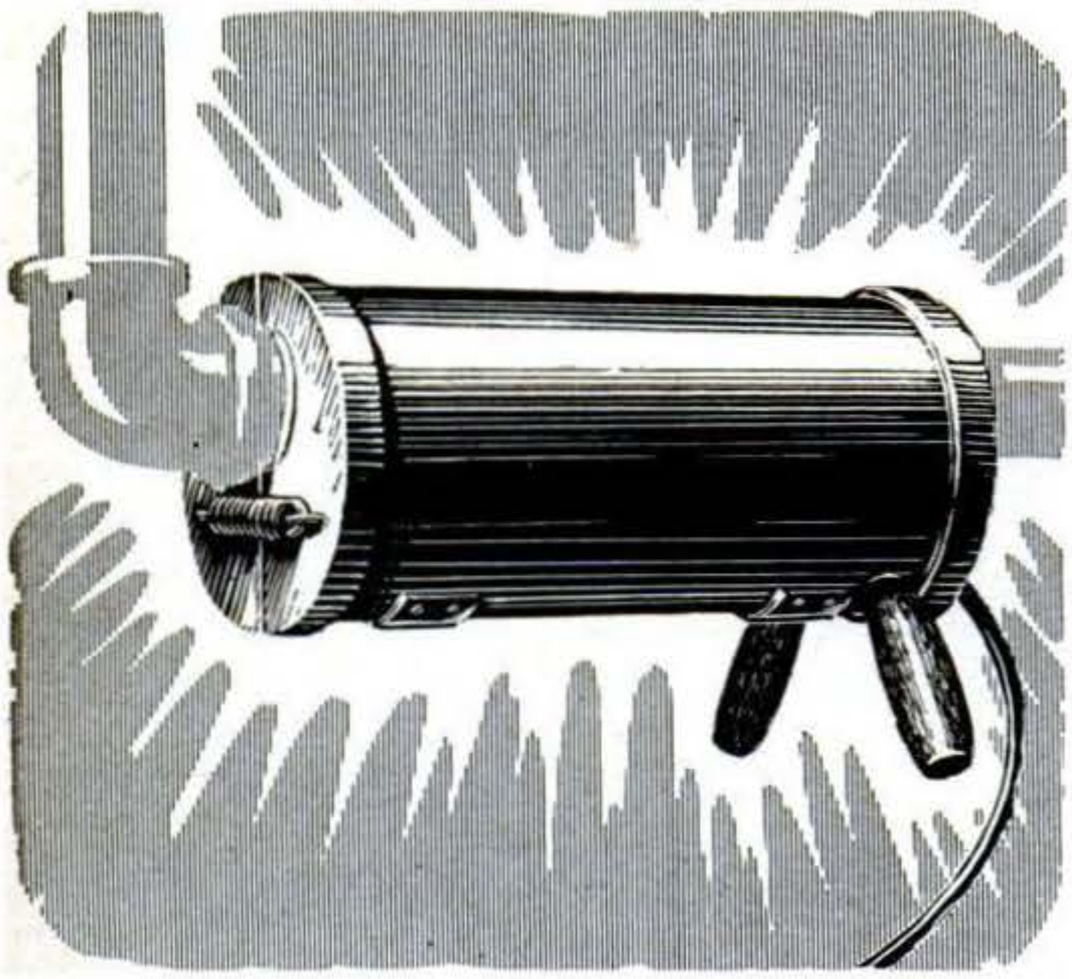
FACED with the rebuilding of their blitzed cities, the British are developing new machines and products to speed construction. Here are some of the latest from the Ministry of Works field-test unit. Several of the machines designed to end laborious hand pulling and lifting look as though they might prove useful on this side of the Atlantic. Whether they would be acceptable to U. S. building-trades workers, fiercely defensive of their traditional working rules and methods, is, however, yet to be seen.

Here's how a slate roof can be laid without putting on each slate separately. Whole sections can be preassembled, either at the site or beforehand, and fastened to the roof as a unit.

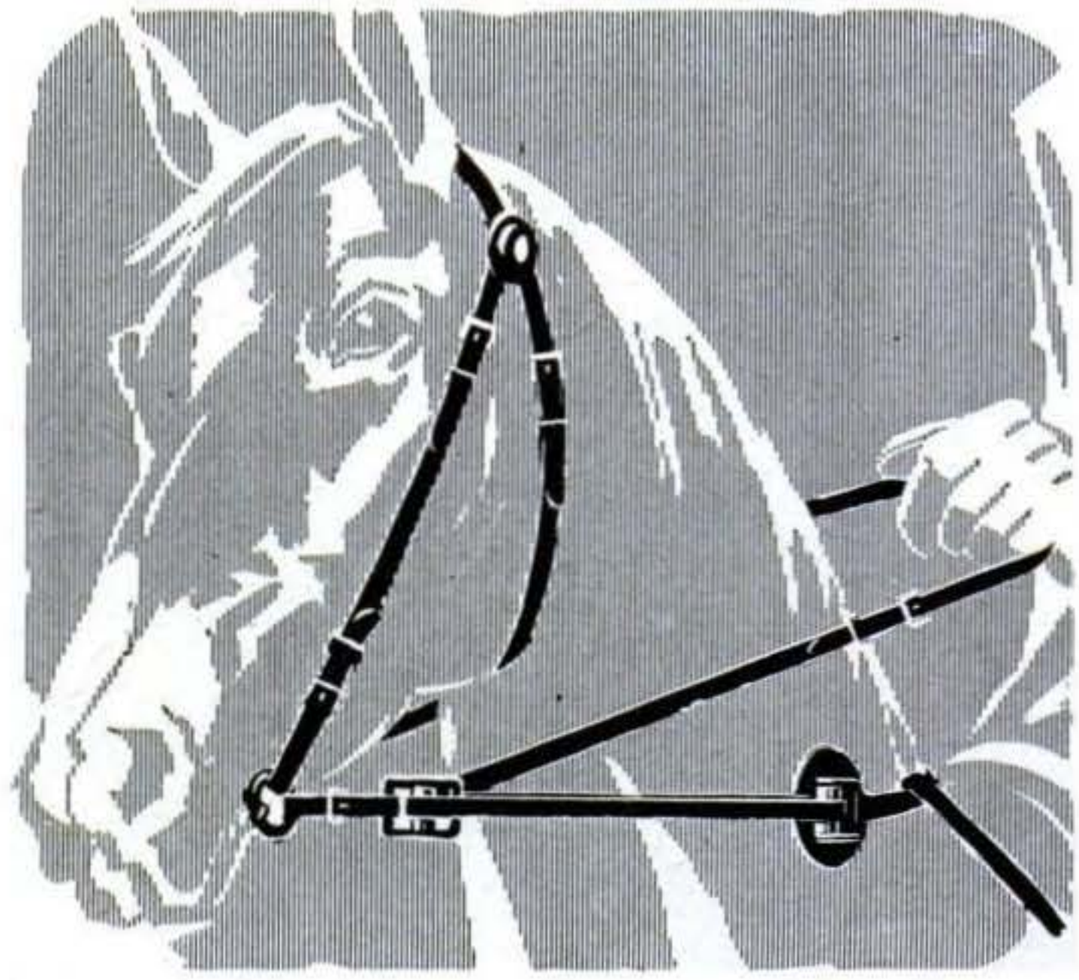
New Ideas from the Inventors



Extra Wheels Prevent Miring. A pair of retractable wheels has been invented by Kibbey W. Couse, of Newark, N. J., to help keep heavy trucks from bogging down in mud. Belt-driven by the rear wheels, the smaller auxiliary wheels can be lowered when needed, making the belt touch the ground. This increases traction.

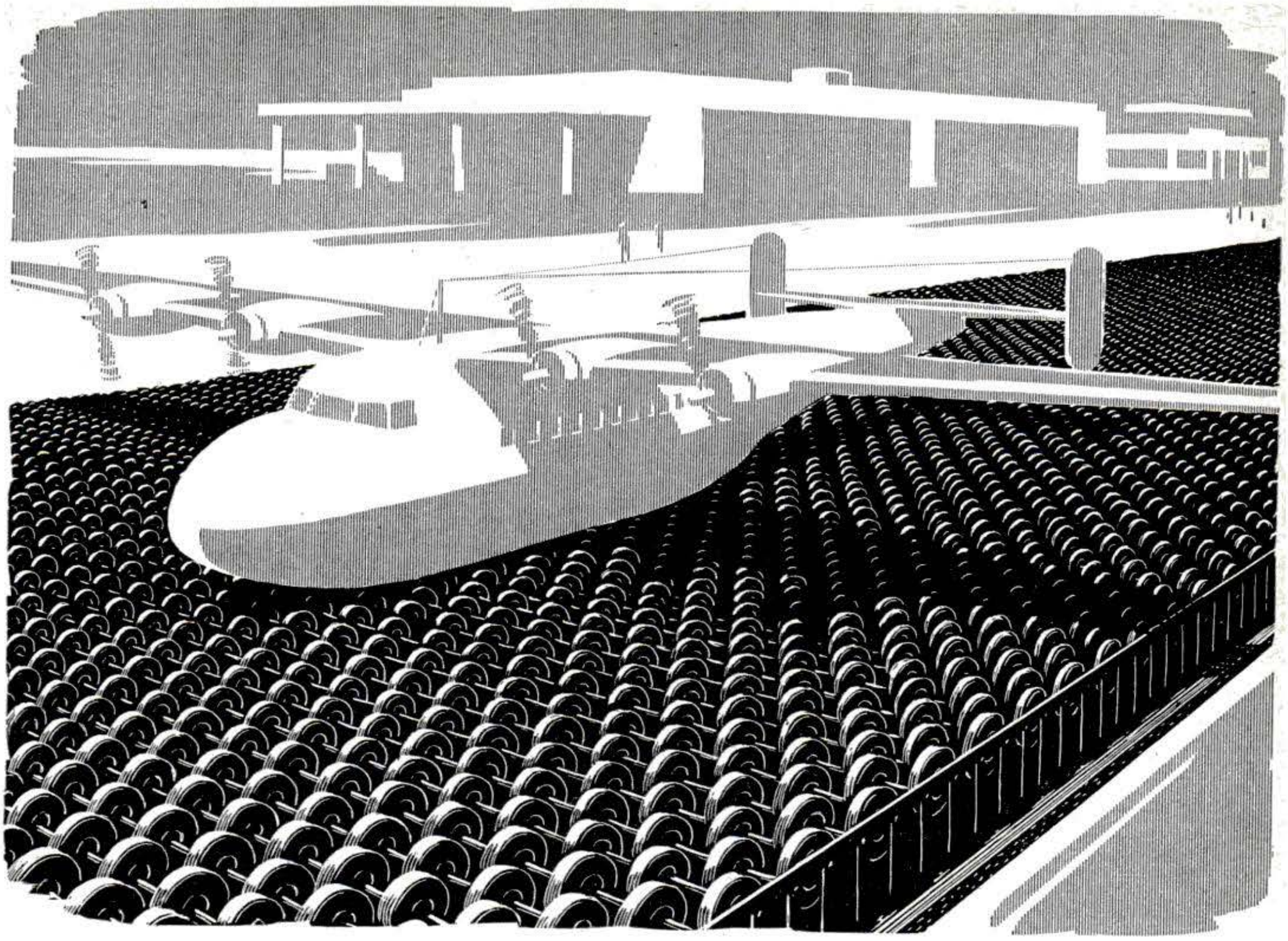


Hand Heater Thaws Pipes. A far cry from the plumber's blowtorch, this portable household heater is designed to free frozen water pipes in only a few minutes. Clamping around a pipe like a large, elongated claw, it surrounds it with electrical heating coils. The device was invented by Francis L. Taulman, of Tulsa, Okla.

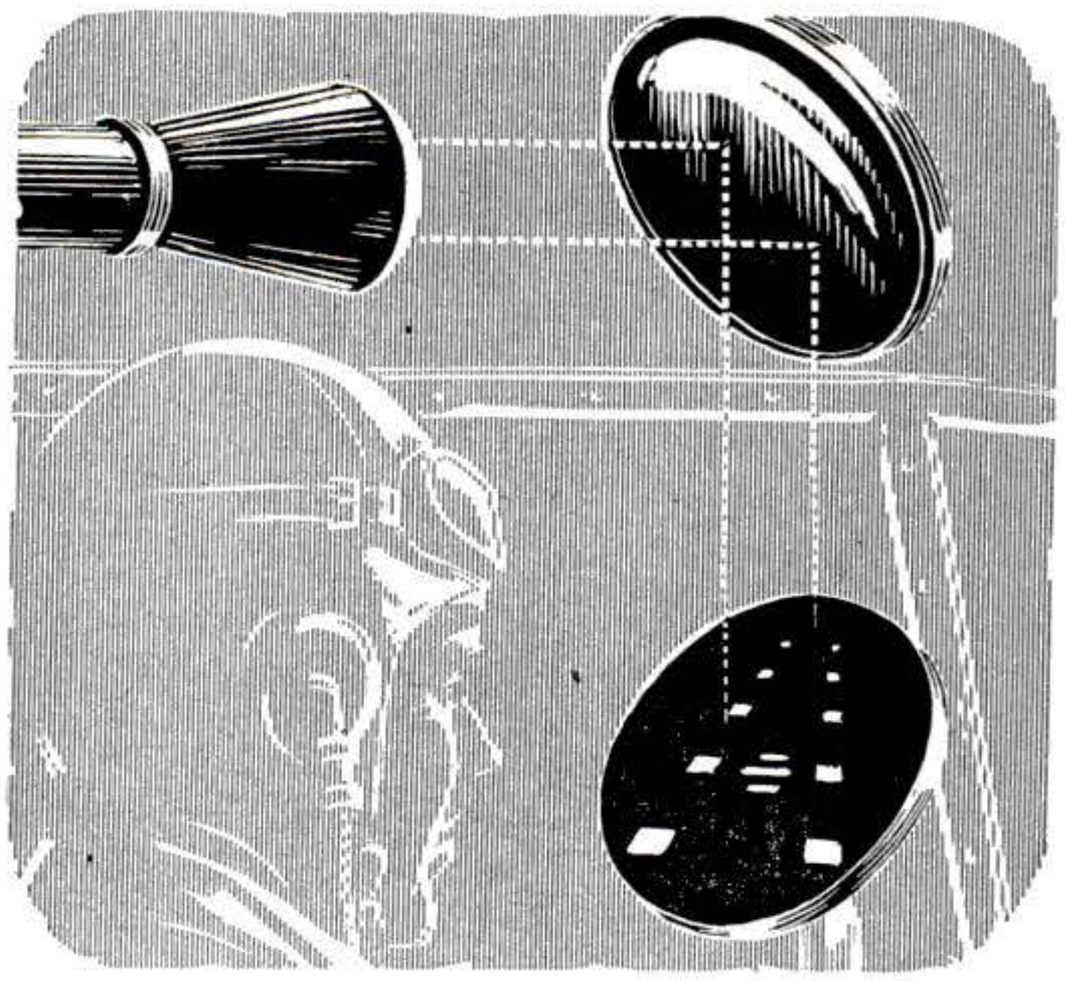


Pulleys Help Guide Horse. An eager or unruly horse would be no problem with the novel bridle patented by John D. Telford, of Palmerston North, New Zealand. Instead of pulling directly on the bit, the reins run through pulleys attached to it. The mechanical advantage thus secured gives the rider far greater control.

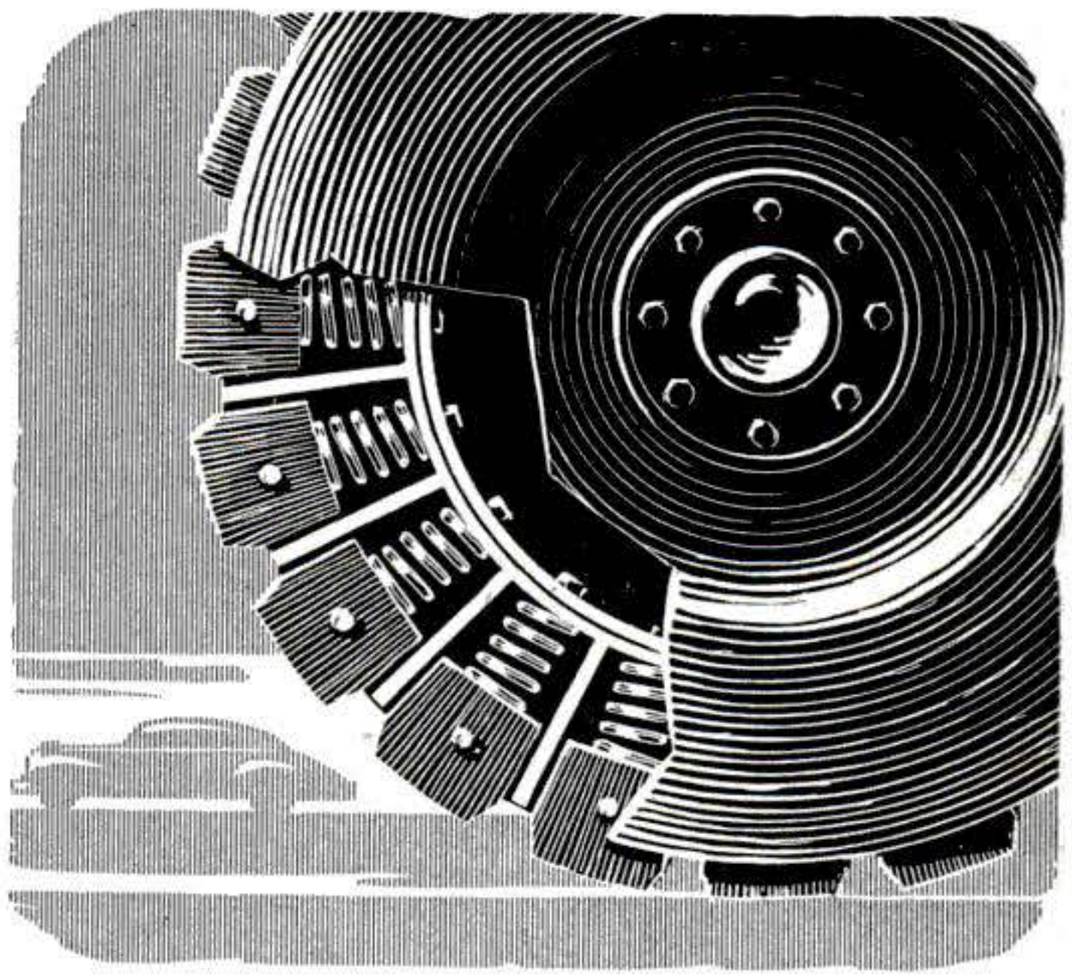
Copyrighted material



Planes Need No Wheels. Airplanes should keep their wheels on the ground, believes Samuel S. Knox, of Long Beach, Calif. He has patented a landing strip formed of pneumatic-tired wheels, which could be powered to speed take-offs and braked to shorten landing rolls. It would free the plane of landing-gear weight.



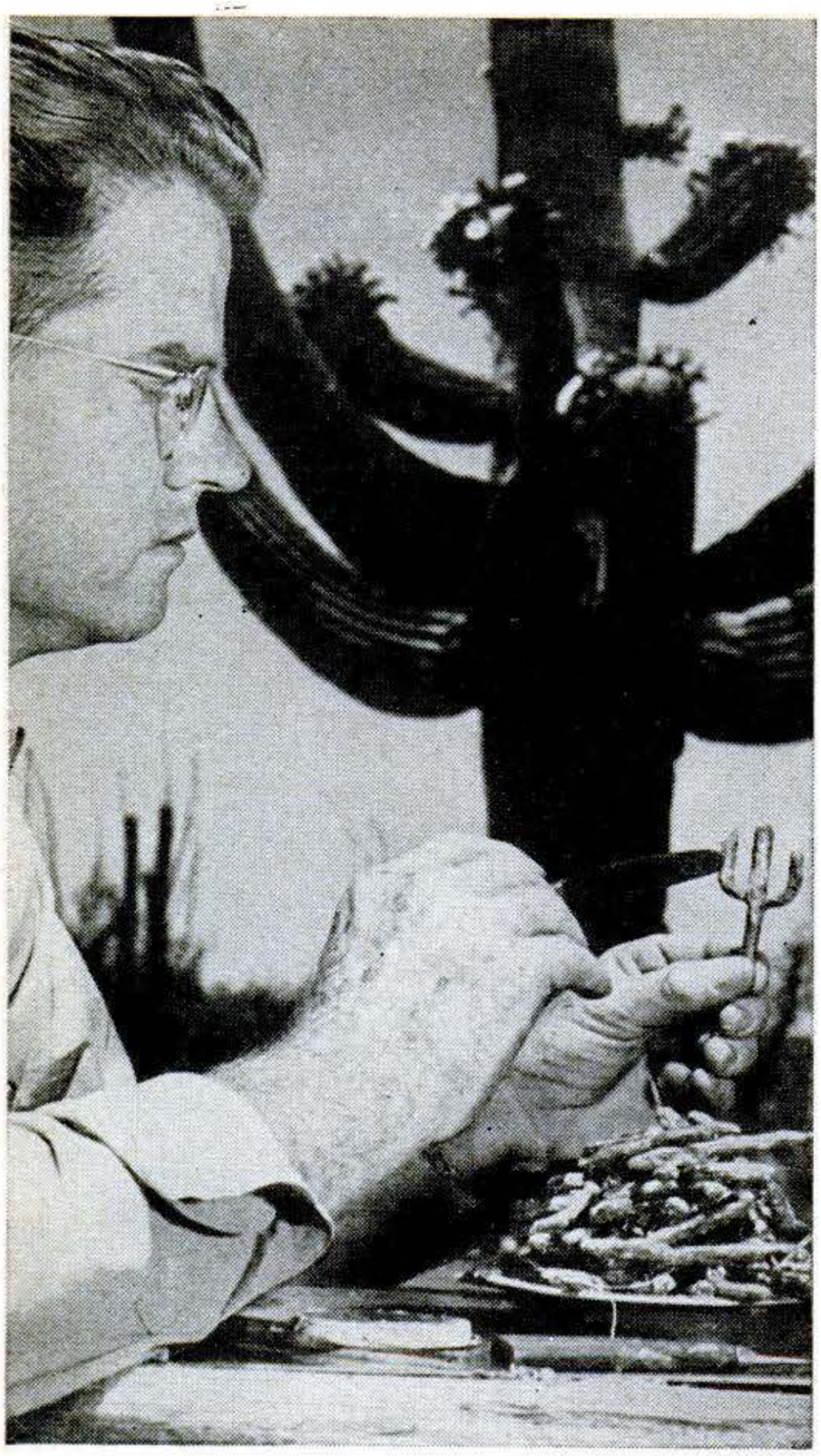
Helping Pilots Alight. This radio landing aid will let a pilot "see" a fogged-in airport's lights. Invented by E. M. Deloraine and G. J. Lehman, of New York, it picks up radio signals from each light, then throws the image pattern on a semitransparent screen through which the pilot eventually sees the real lights in same pattern.



Airless Tire Saves Flats. Here's a tire you'd never have to change for a flat. Since it requires no air, it can't blow out or puncture. Its surface consists of closely spaced, teethlike treads, each separately spring-seated in the body of the wheel for the necessary bounce. It was invented by Joseph T. Murphy, of Akron, O.

Copyrighted material

Desert Scenes In Miniature



Only artificial part of the dioramas are clay on wire replicas of the giant saguaro. Here a worker is putting finishing touches on the plant nature didn't supply in diminutive form.

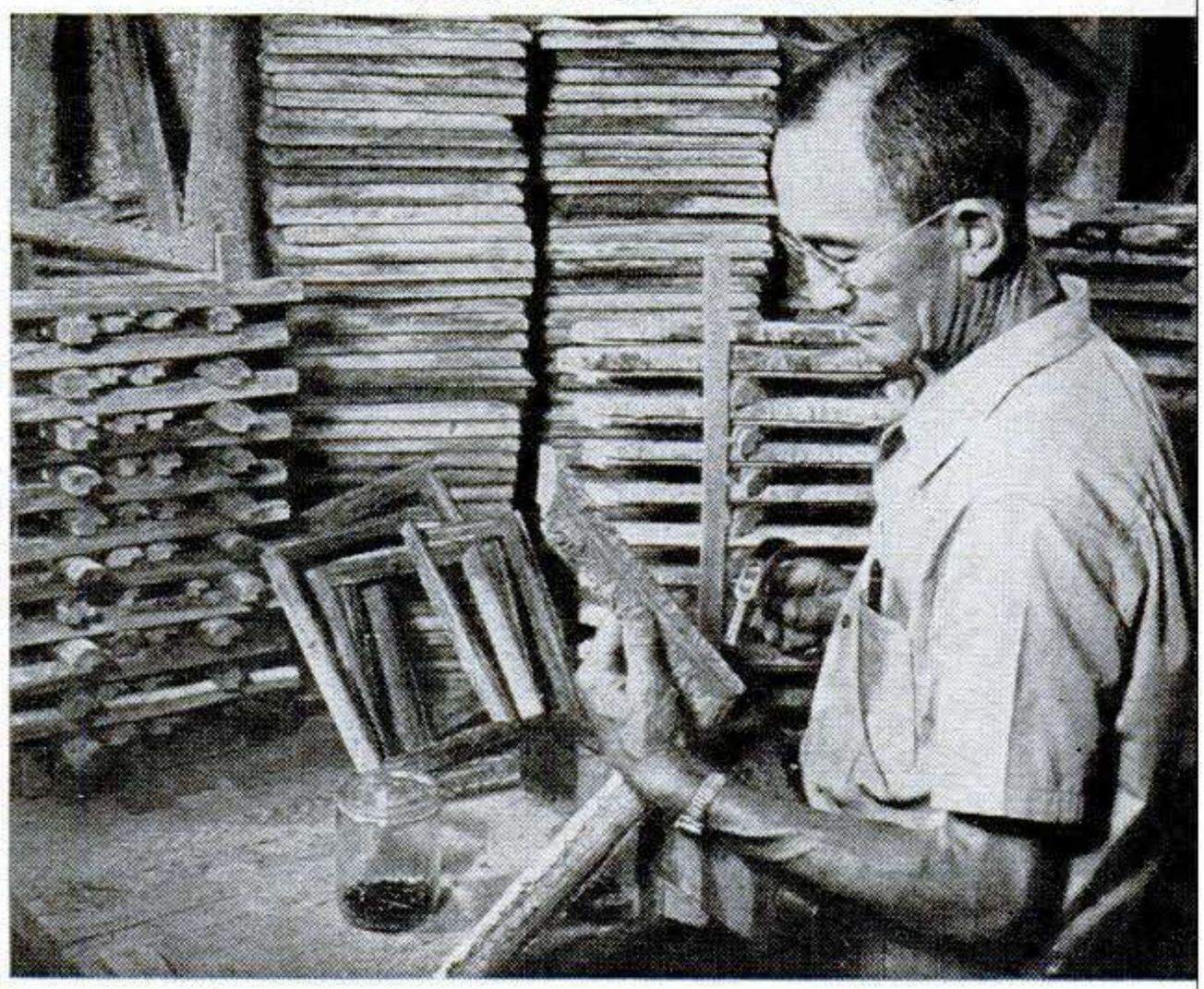
WANT a corner of the desert in your living room? The Knauff family of Tucson, Arizona, will sell you everything but the wind. And the miniatures are true to the colorful beauty of the original, because the sand, rocks, and plants come from the desert.

First step in making these three-dimensional miniatures is the sky and mountain background, painted in delicate pastels. Next a concave foreground is packed with a wet, mudlike mixture that is worked to form roads and natural desert contours. To this base the tiny plants and fragments of colored rock are added, and the whole sprinkled with sand. Oil paints give the final color: dry grass tufts and dull moss become realistic greasewood and cholla; brilliant orange flowers appear on waving ocotillo.

Although started as a hobby some years ago, these unusual pictures are today a thriving business. With a staff of assistants, the Knauffs have turned out more than 50,000 of the desert dioramas.

Photos by Ray Manley from Western Ways

The desert itself supplies the other basic materials out of which its realistic reproductions grow. Here a day's booty—Indian wheat, tassels of date palms, tiny burrs—is sorted.

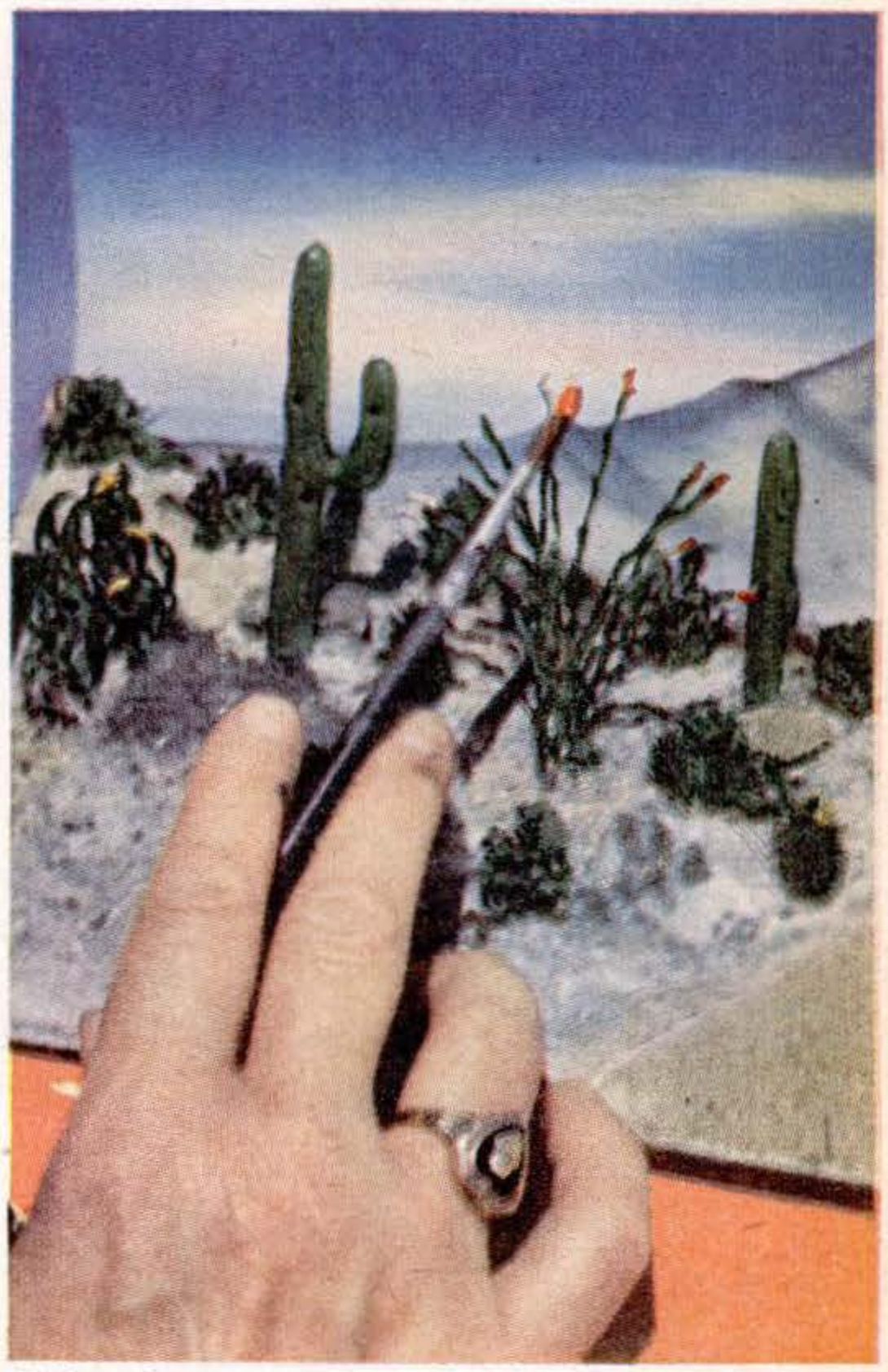


Making frames like those above from the skeleton of the saguaro, a tall, treelike cactus, started the Knauff family in the business of creating these miniature desert scenes.

Copyrighted material

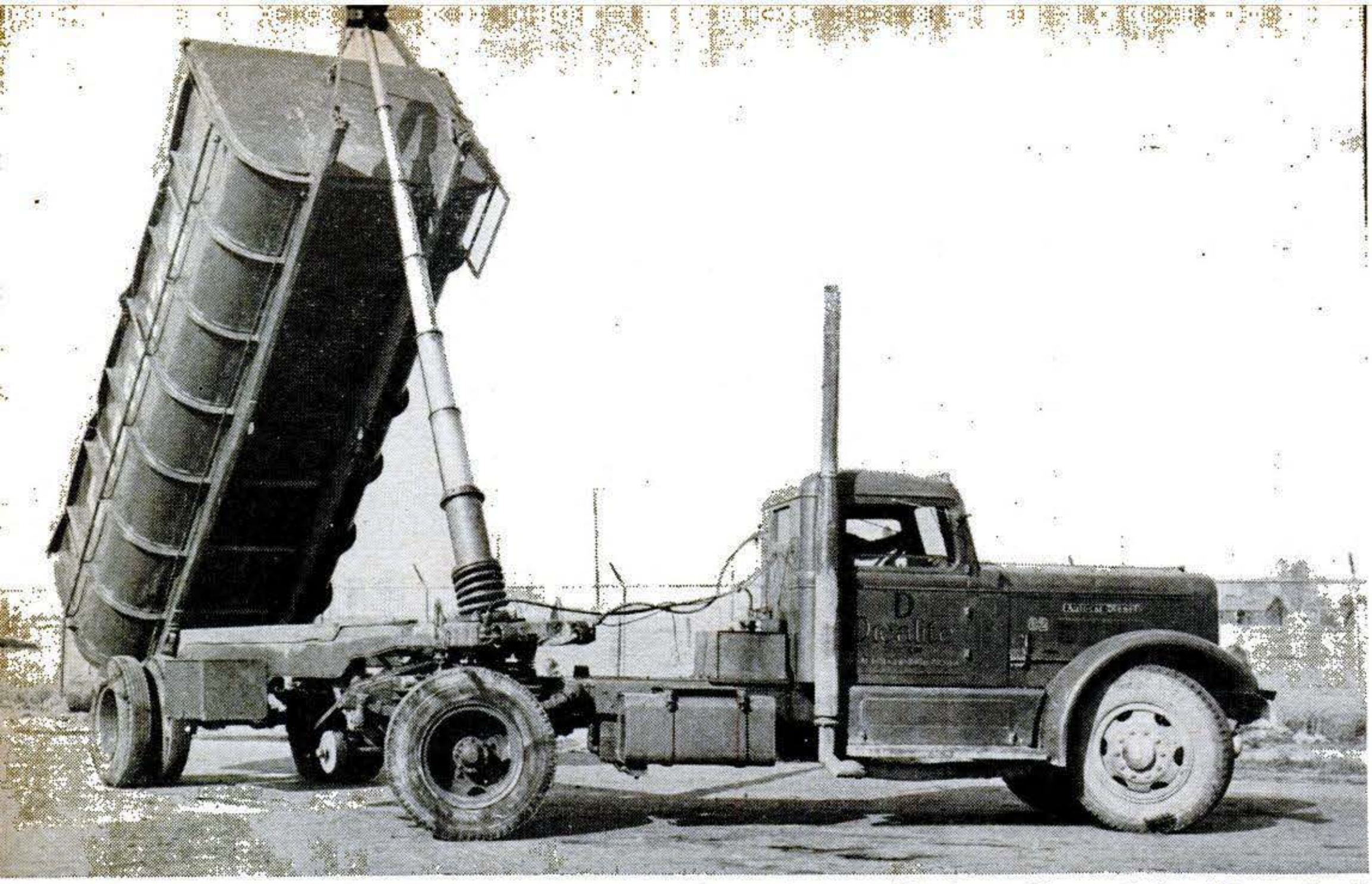
In this vivid diorama, snips of desert grass make realistic sage; and tiny burrs, barrel cacti.

After background has been painted in, the concave foreground is packed with a mudlike substance to make the "ground" of the desert scene. Here a palette knife is used to cut a highway.



Colored pieces of rock are set into the mixture, and gashes made to hold the bits of trimmed moss and grasses that form the plants. Oil paints add the bright hues of desert growth.

Copyrighted material

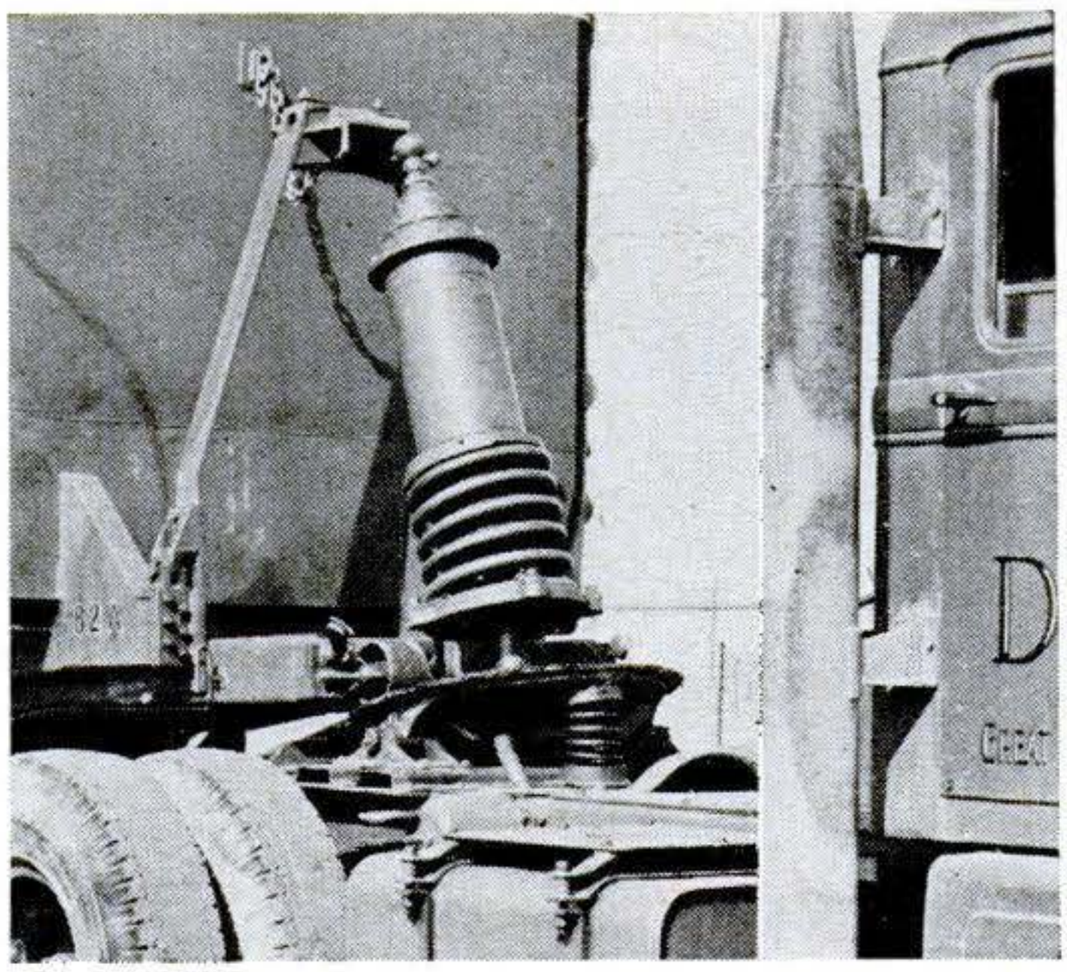


Extended, the seven-sectioned, telescoping dump hoist is 18 feet tall, can lift a 50-ton load.

Multi-Lift Hoist Dumps Faster

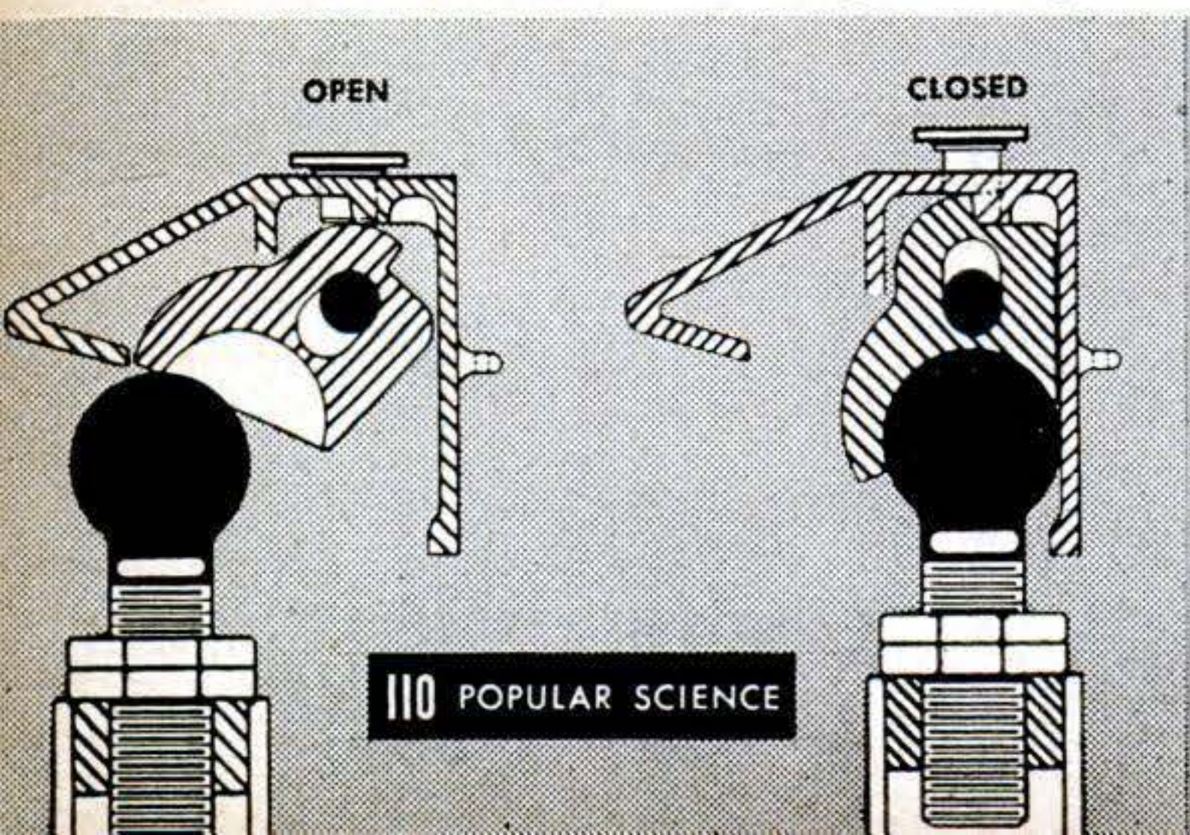
THIS giant Fruehauf trailer truck speeds dumping operations by allowing one truck to handle several trailers. The dump hoist, a telescoping, hydraulic jack, is mounted on the truck instead of the trailer and couples automatically, eliminating separate hoists and hose connections.

To dump a trailer, the truck just backs up to it; one automatic coupling hooks the two together, while another locks the hoist in place. Under 600-p.s.i. pressure, the hoist then upends the trailer box in a matter of seconds. Uncoupling of the trailer is the only manual operation required.



As truck backs up to trailer, a V-slot guides hoist's knobbed head into self-locking coupling at top of trailer's hinged A-frame. Hoist is swivel-mounted for self-alignment with trailer.

As knob engages coupling, a half-socket casting turns inward, as diagramed below, at left. As hoist starts to rise, it is then pushed upward and locked in place. Close-up at right shows hoist locked in trailer's A-frame. Note the close nesting of the retracted hoist sections.



pyrighted material

Hercules Hogs Harbor

WITH port facilities dwarfed in the background, this photograph of the Hughes flying boat dramatically frames its massive proportions. Recently flight tested (PS, Dec. '47, p. 92), it is estimated that the 400,000-lb. plywood giant will carry more than 500 people, or a total payload of some 70 tons. Its eight engines develop 24,000 hp.

Backing Up the Cargo

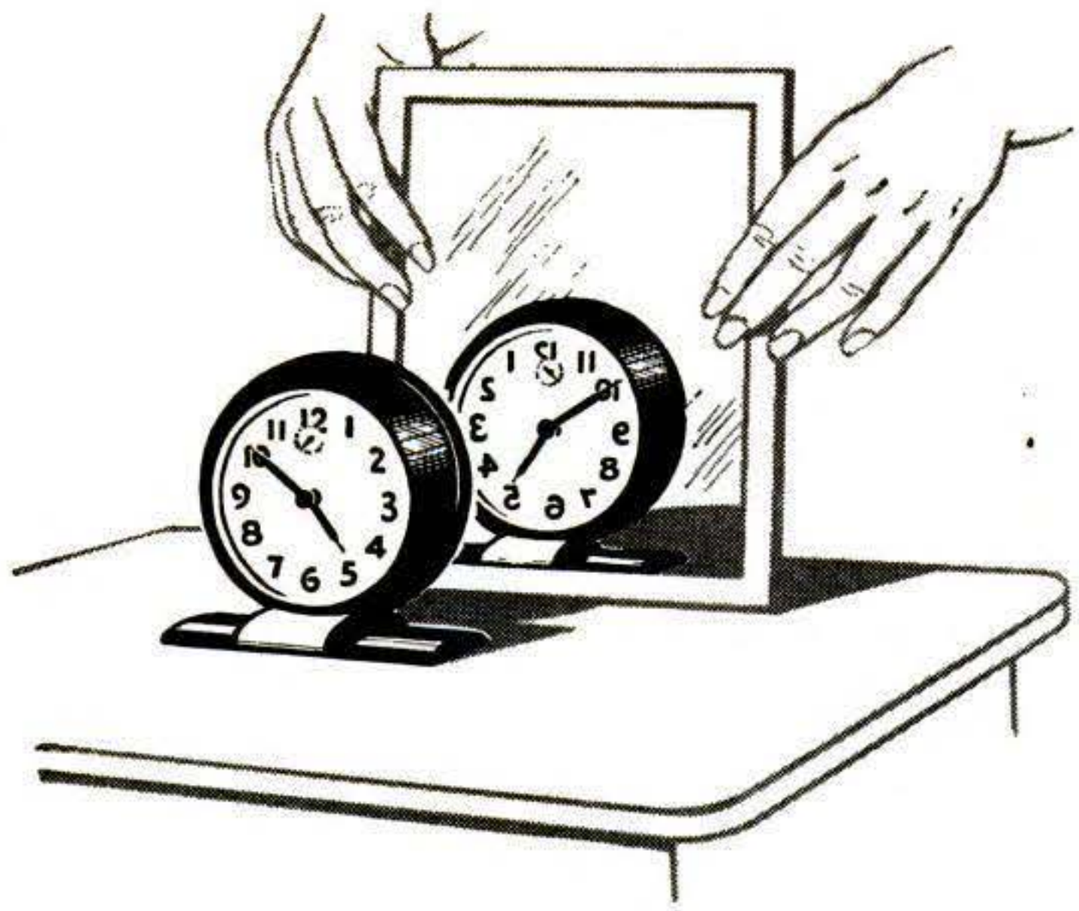
HINGED tail of the planned new Curtiss-Wright CW-32 would make possible the rear loading of very long or bulky shipments. Trailer shown in drawing above would permit the handling of the entire cargo for one destination as a single item, cutting delivery time. Freight compartment would hold household furnishings for 21 average rooms.

Copyrighted material

I'd like to see them make . . .

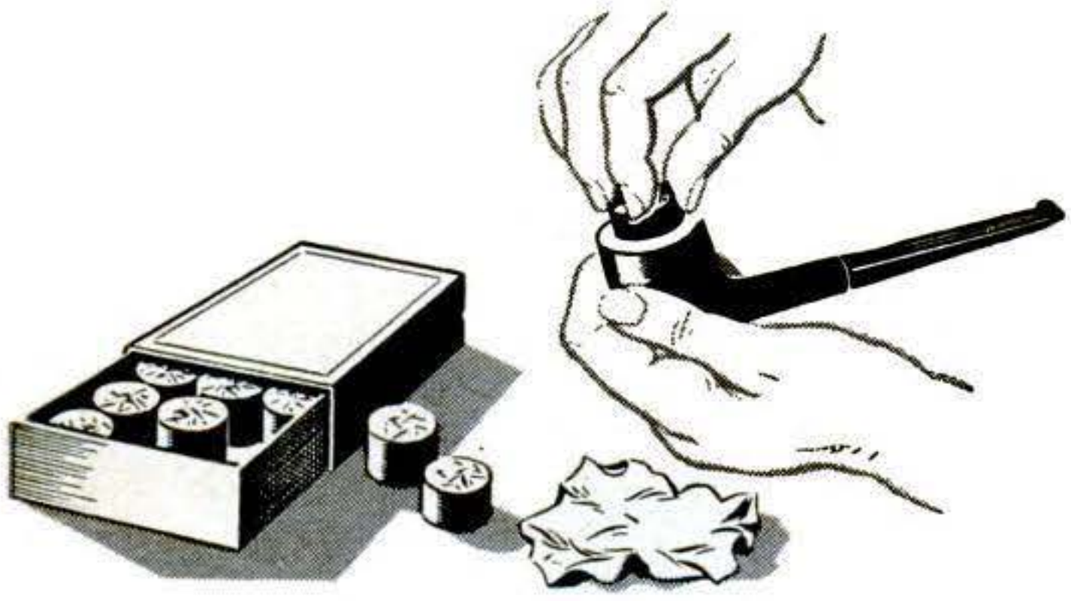
Drawings by Lester Fagans

Everybody has his own pet idea of some gadget he would like to see in general use. What is YOURS? POPULAR SCIENCE will pay $5.00 for every such suggestion that it accepts for publication. Contributions cannot be acknowledged or returned.

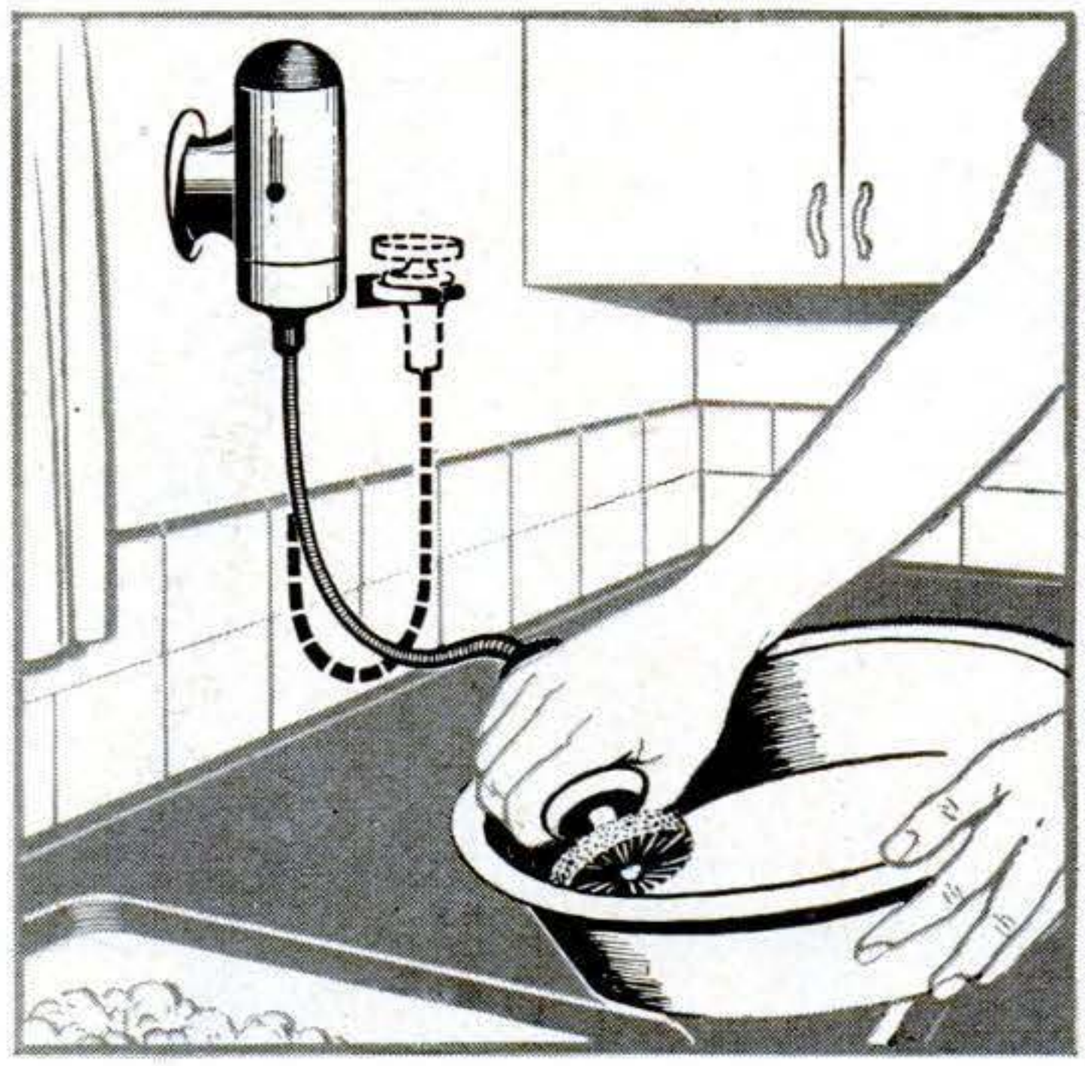


Two-Faced Clocks. On a bedside table between twin beds, such a clock could be read without neck-craning. A gear train would drive the reversed hands. Controls could be put on the rim.—DORIS NELSON.

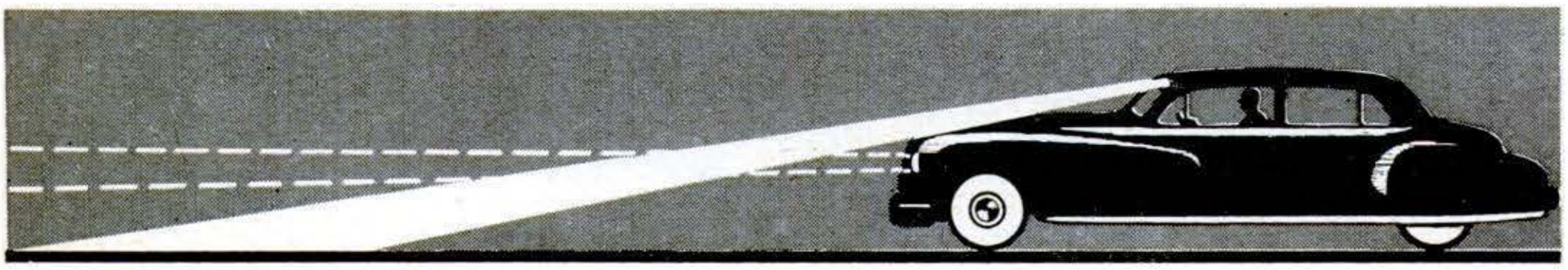
Weighted Pens. If fountain pens were made with a weighted cap, they'd land harmlessly on that end when accidentally dropped—instead of on the point. Hence, you'd save the expense of a new point.—RALPH HANKE.



Individual Pipe Charges. Little packets of tobacco conforming to the inner dimensions of the average pipe bowl could be carried conveniently and would provide an easy loading method.—EDWARD EHRLICH.

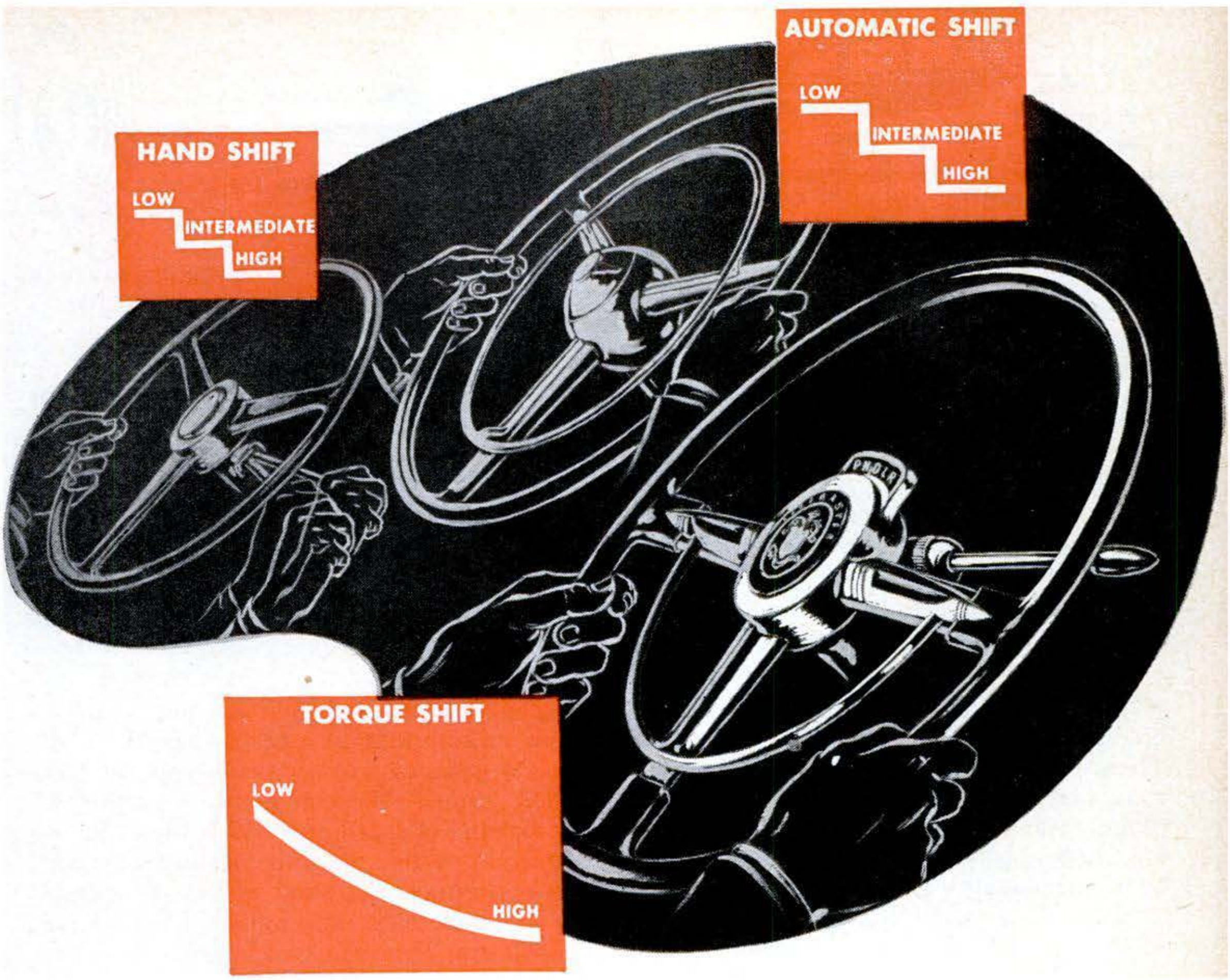


A Power Scouring Brush. It could consist of a rotary wire brush on a stainless-steel flexible shaft running to an electric motor. The unit should be mounted on the wall near the sink.—JIM BENNETT.



Car Headlights Higher. This would help keep oncoming drivers from being blinded. The higher the lamp is placed, the farther ahead it would cast its beam without throwing light directly into the eyes of approaching drivers.—FRED MATHIS.

Copyrighted material



New Buick Flows from Low to High

First torque shift on the road replaces the usual three speeds forward with an infinite number of gear ratios.

By Devon Francis

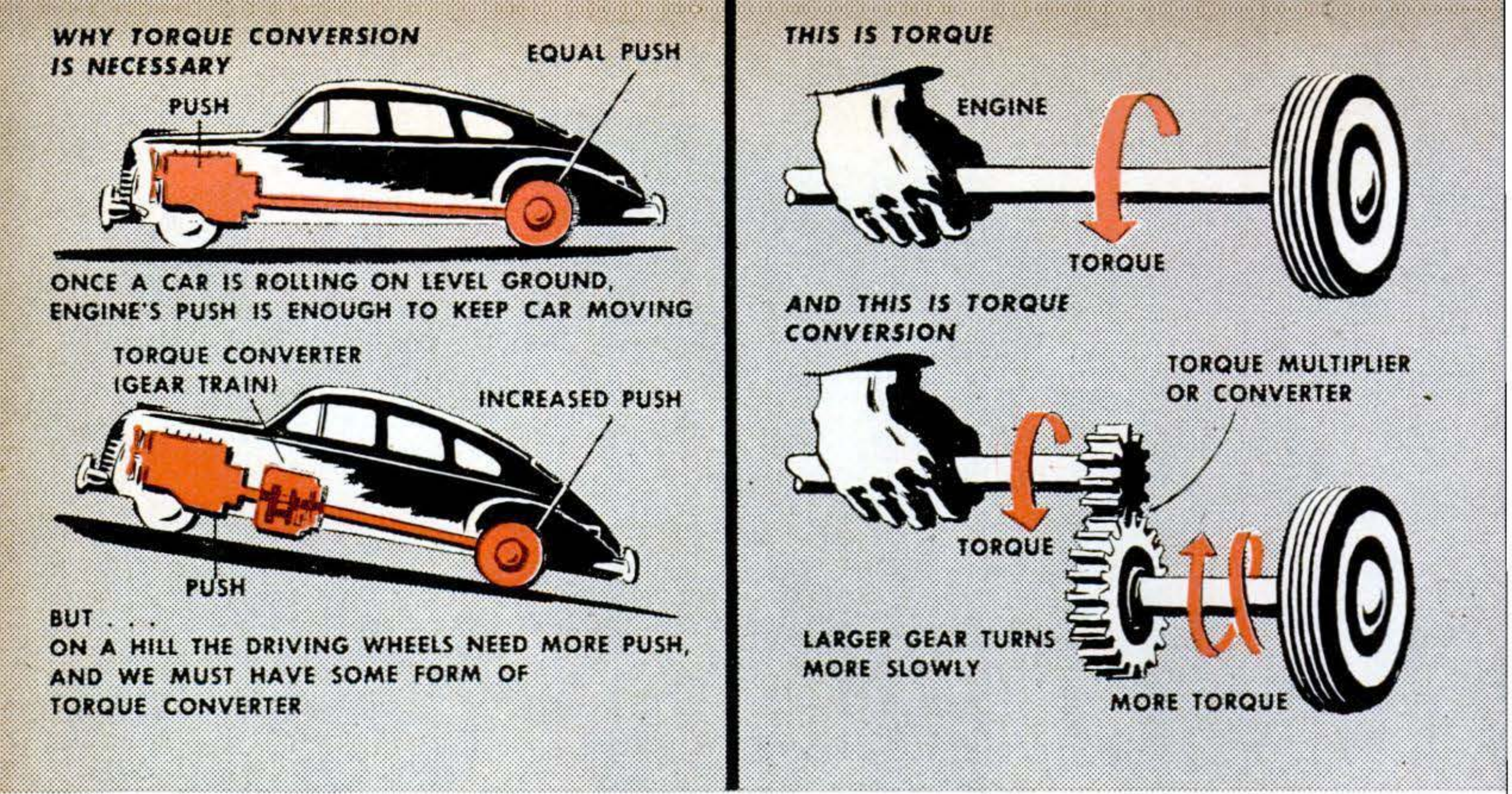
ON HUNDREDS of highways last year U. S. motorists watched a new kind of automobile whiz past them without knowing they were witnessing what promises to be a major revolution in power transmission on wheels.

Late last month the secret was out. Test cars had roamed the Middle West, the South, Rocky Mountain states, and California for months. Outwardly each looked like a 1946 or 1947 job, but tucked between its engine and propeller shaft, in place of transmission gears, was something called a "torque converter."

For passenger cars the torque converter may be the biggest stride in transmissions in a quarter of a century. Every major Detroit manufacturer is experimenting with some version of the idea. But for 1948, the Buick Roadmaster model has stolen a march on the industry.

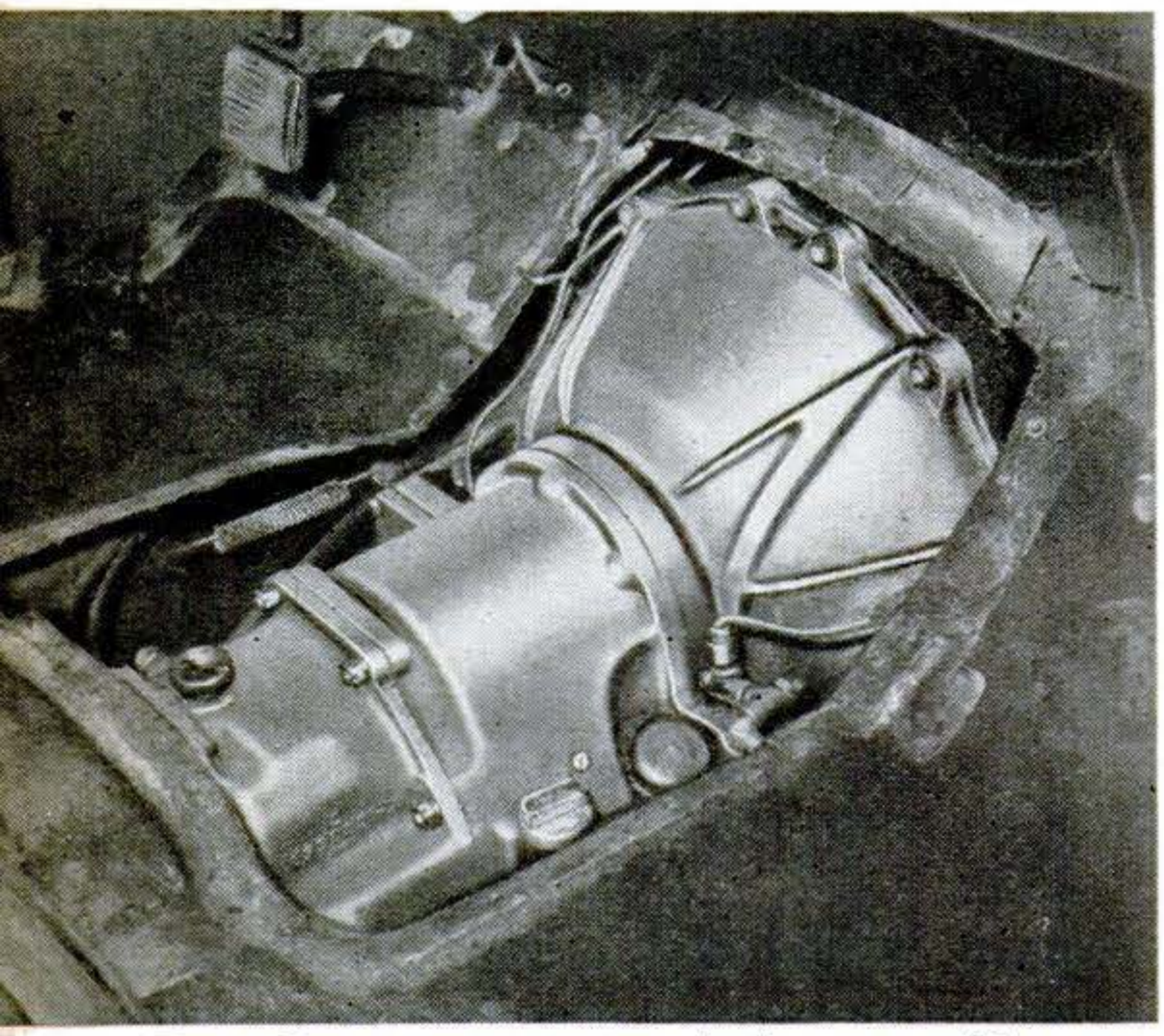
The torque converter gives to vehicles with internal combustion engines the same kind of smooth power flow produced by steam engines and electric motors. It is to automobiles what the variable-pitch pro-

Copyrighted material



peller is to airplanes. It gives the motorist literally an *infinite* number of "gear ratios." Tromp on the accelerator from a standing start, and the car moves off as smoothly as though you were releasing the brakes on a hill. Lift your foot, and it feels like a power boat cushioned by the fluid it floats in.

To see how torque conversion works, let's start with how your engine makes the car move. The engine's *power* means its ability to give your car a certain amount of push while making it go at a certain speed. This push is given to a rotary crankshaft, so it is called *torque*. We can increase torque at the expense of speed or speed at the expense of torque. When we shift into low gear for lots of torque—push—and not much speed, we are increasing the engine's leverage on the wheels. This increased leverage is called *torque multiplication*. It's what an ordinary gear shift does.



Dynaflow transmission looks not unlike conventional type when installed in car, but with cooler it weighs almost 50 lb. more. Since it can multiply torque only about 2¼ to 1 as compared to 4 to 1 for low speed of average car, a geared low with ratio better than 4 to 1 is added to the Buick for emergencies. Torque converter uses eight quarts of special oil.

Hydraulic torque conversion means using a fluid to provide the proper ratio of speed and torque. The fluid supplies the proper "gear ratios" in a complete absence of gears. With a torque converter you can say of your gear ratios, as Jimmy Durante might say, "I got a million of 'em."

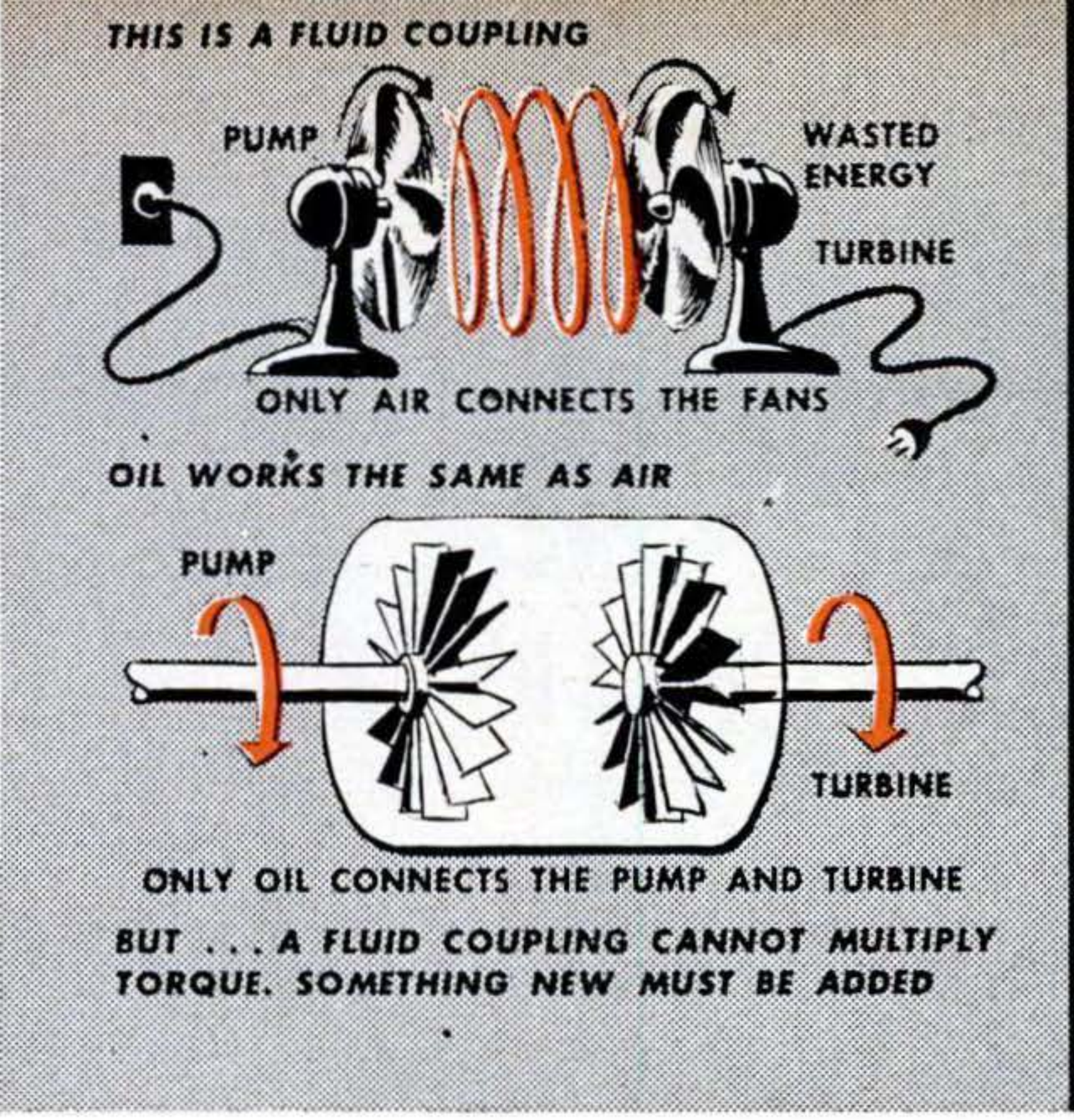
Substitute for Friction Clutch

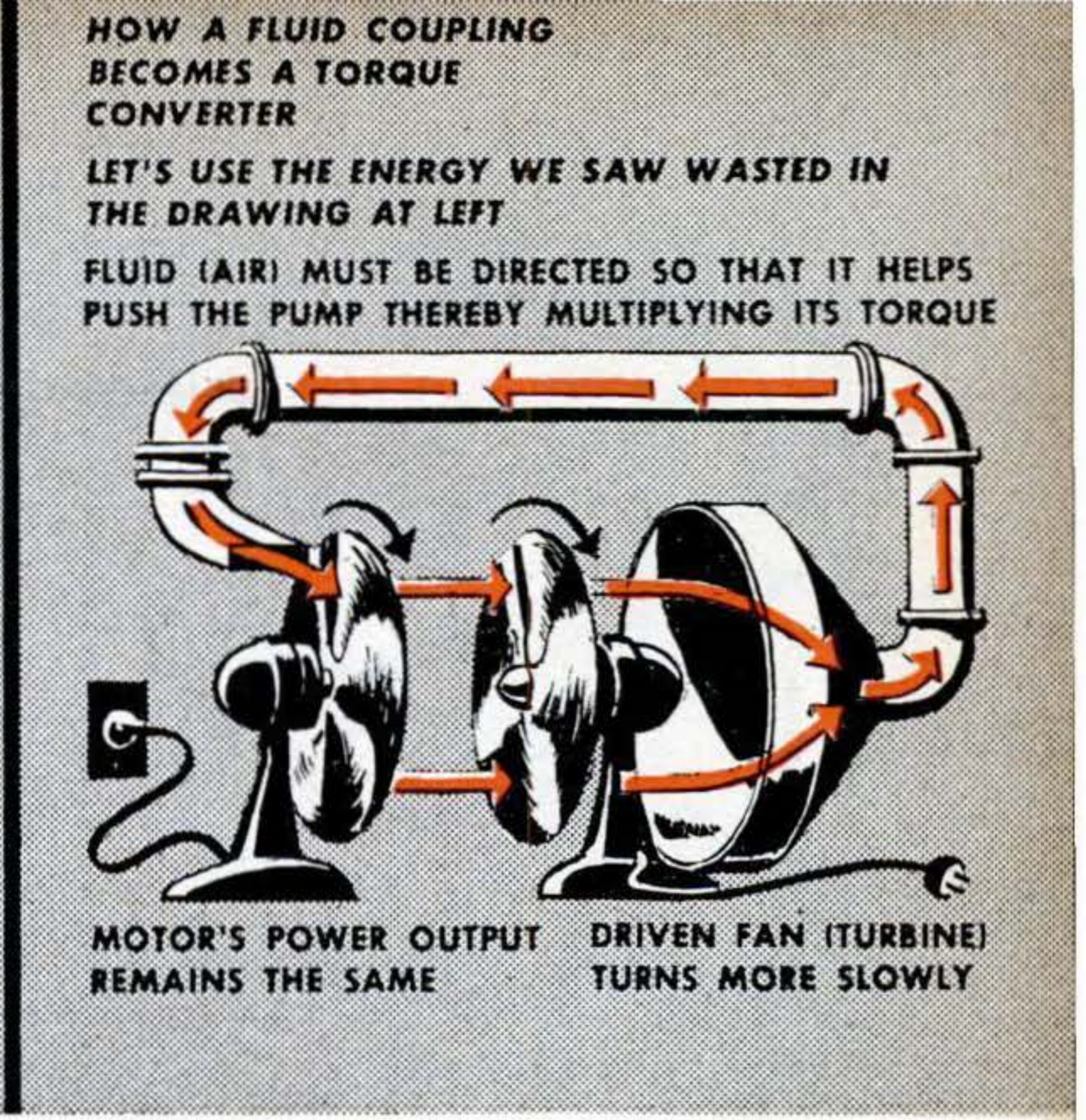
To get at the nub of hydraulic torque conversion, let's examine the simple fluid coupling also known as the "fluid clutch." It is only a substitute for a friction clutch. Chrysler, Oldsmobile, and some other cars have them.

The fluid coupling consists of a vaned driving member and a vaned driven member working in an oil bath. They work exactly like a couple of electric fans placed face to face with one of them plugged into an electric outlet. One fan blows; the second fan turns with the blast of air from the first fan. *This is a fluid coupling.* It transmits motion without gears.

But mark this point: No matter how ef-

Copyrighted material





ficient the two fans are, the first can transmit to the second only the amount of torque or twist it has in its shaft. The second fan can't be "geared down" through the fluid coupling to boost the twist.

An automobile's fluid coupling works the same way. It doesn't "gear down"—it doesn't provide torque multiplication. If only a fluid coupling were put between the engine and a car's propeller shaft, it would be like driving from a standing start through all speed ranges in high gear. The fluid coupling has to hitch into a gear train or its equivalent when more "push" at the rear wheels is needed than can be obtained merely by depressing the accelerator pedal.

That these gears can be, and in some cars are, shifted automatically is beside the point. A gear transmission remains a gear transmission. What Buick has done is to replace the gear transmission with a hydraulic torque converter that is at the same time a fluid coupling.

Two Kinds of Oil Flow

Now let's see how these two are combined. Interestingly enough, you can get torque conversion by altering the design of a simple fluid coupling. That's because of the nature of the oil flow inside the coupling. There are two kinds of oil flow, rotary and vortex. In rotary flow the oil swims in a circle with the centrifugal pump of the coupling (or Number One electric fan) and the turbine (or Number Two electric fan). In vortex flow it moves in a spiral.

At low rotational speeds of the coupling the oil flows outward from the hub of the pump to its perimeter. There, in vortex flow, curved blades catch it and toss it across to the turbine, as a basketball player would pass the ball to a teammate across the court. At the turbine side other blades catch the oil. The kinetic energy that is imparted to the oil by the pump is transformed into mechanical energy as it hits the turbine. The turbine turns under the impact.

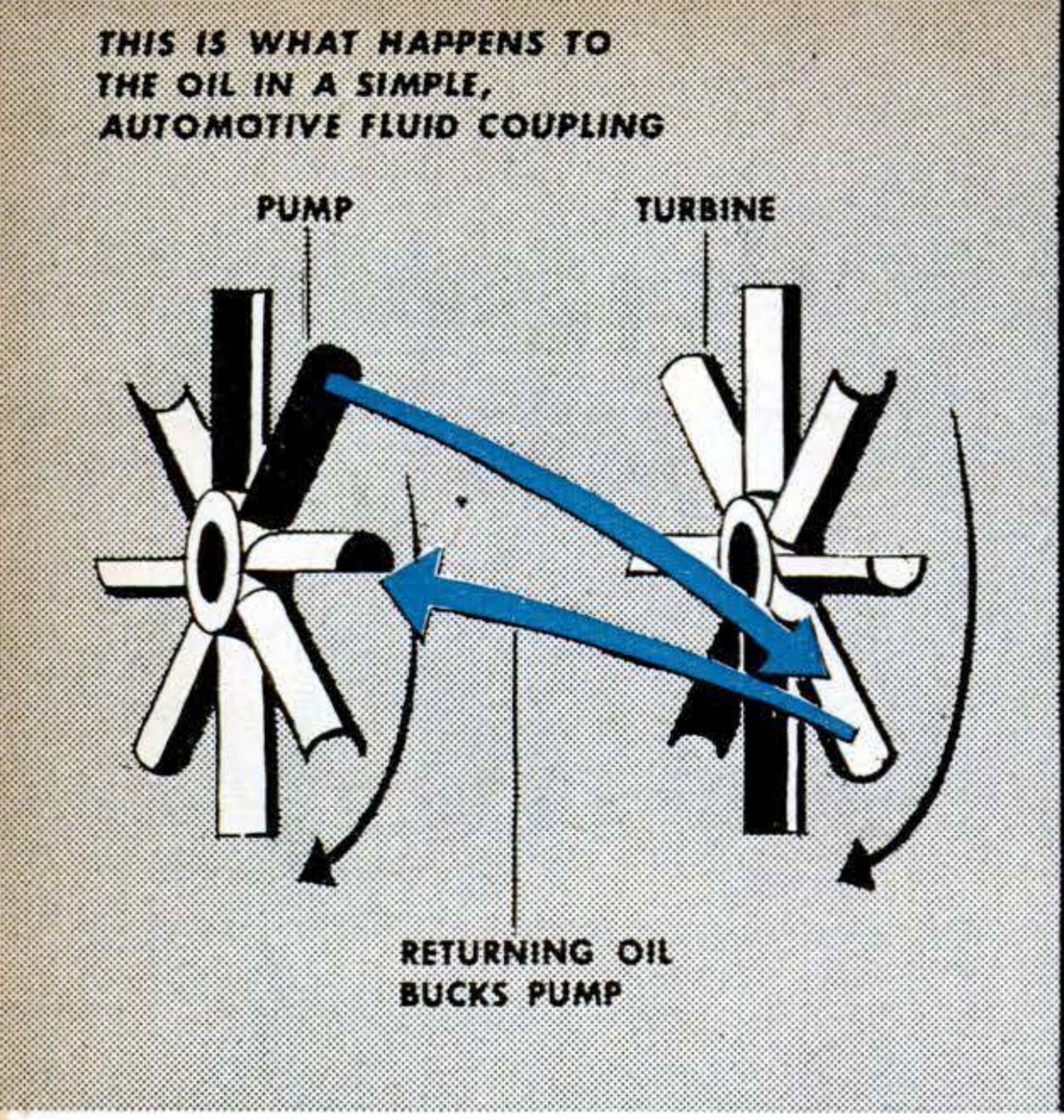
Blades Act as Buckets

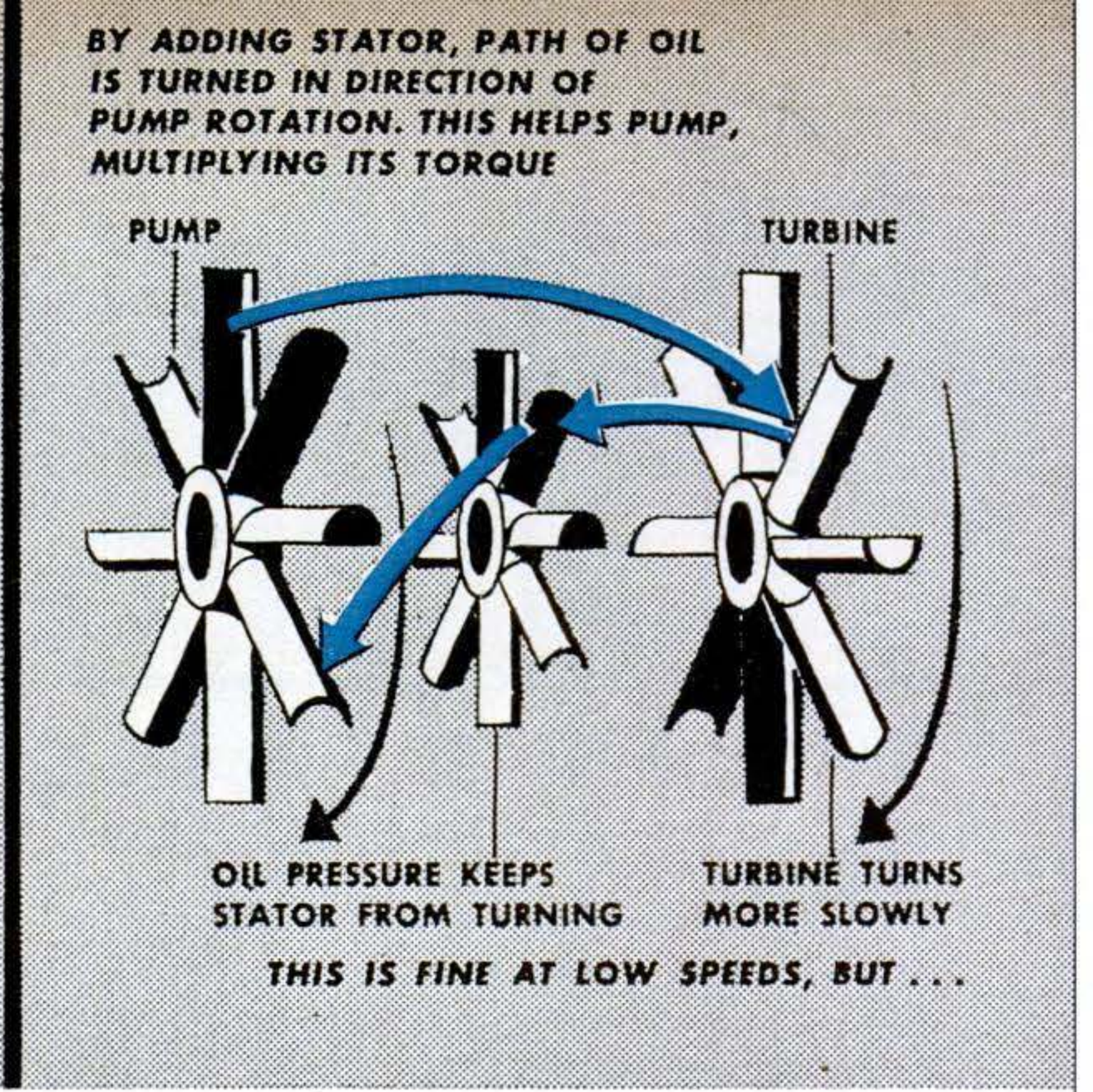
Something funny happens right here. The blades of both pump and turbine act somewhat like buckets. To make the fluid coupling work, the buckets on the pump must be concave in the direction of the rotation, while *those on the turbine must be convex.*

Up to now the oil is willing and well-behaved. But suddenly it gets stubborn. It flows from the perimeter of the turbine down to the hub, and there some trouble starts. It still has a lot of kinetic energy, and on account of the curve of the turbine blades it proceeds to spew this energy *against* the blades of the pump. It acquires this reverse English in a caroming action off the turbine blades. The pump conscientiously keeps tossing the ball to the turbine and the turbine keeps spitting in the pump's eye.

Getting torque multiplication from a fluid coupling just means making the oil help

Copyrighted material





rotation instead of hinder it at low speeds.

This is how it's done: Stationary vanes called stators are interposed between the pump and the turbine. Short and stubby, these stators are snugged into the assembly at the hub, where the oil returns to the pump from the turbine. They catch the oil leaving the turbine, smack it smartly, and send it off in the right direction.

Instead of bucking the pump, the oil boosts its torque.

Let's return to the example of the electric fans. If you grabbed the air as it left the second fan and piped it back to the first fan, and blew it against the blades of that fan to increase its torque, you would have torque conversion. This actually would be more twist at the shaft than the motor would supply by itself. In increasing its twist it would transmit more energy to the air it blew. The air would transmit more torque to the second fan. The second fan would get *torque multiplication.* And the source of this?—the energy in the air that otherwise would be wasted.

Rear Wheels Get Added Push

The same thing occurs in a hydraulic torque converter. The engine flywheel is bolted to the pump and transmits to it the twisting effort of the crankshaft. The oil flow boosts the pump's twisting effort. This boost is transmitted to the turbine. The turbine experiences torque multiplication. It transmits that to the rear wheels as added push. The twisting effort of the crankshaft has been multiplied at the point where it is put to work.

The evolvement of torque conversion by hydraulics early in this century was one of the world's great advancements in the art of power transmission. It works beautifully in constant-speed engines. It is near-perfect for high-capacity reduction drives.

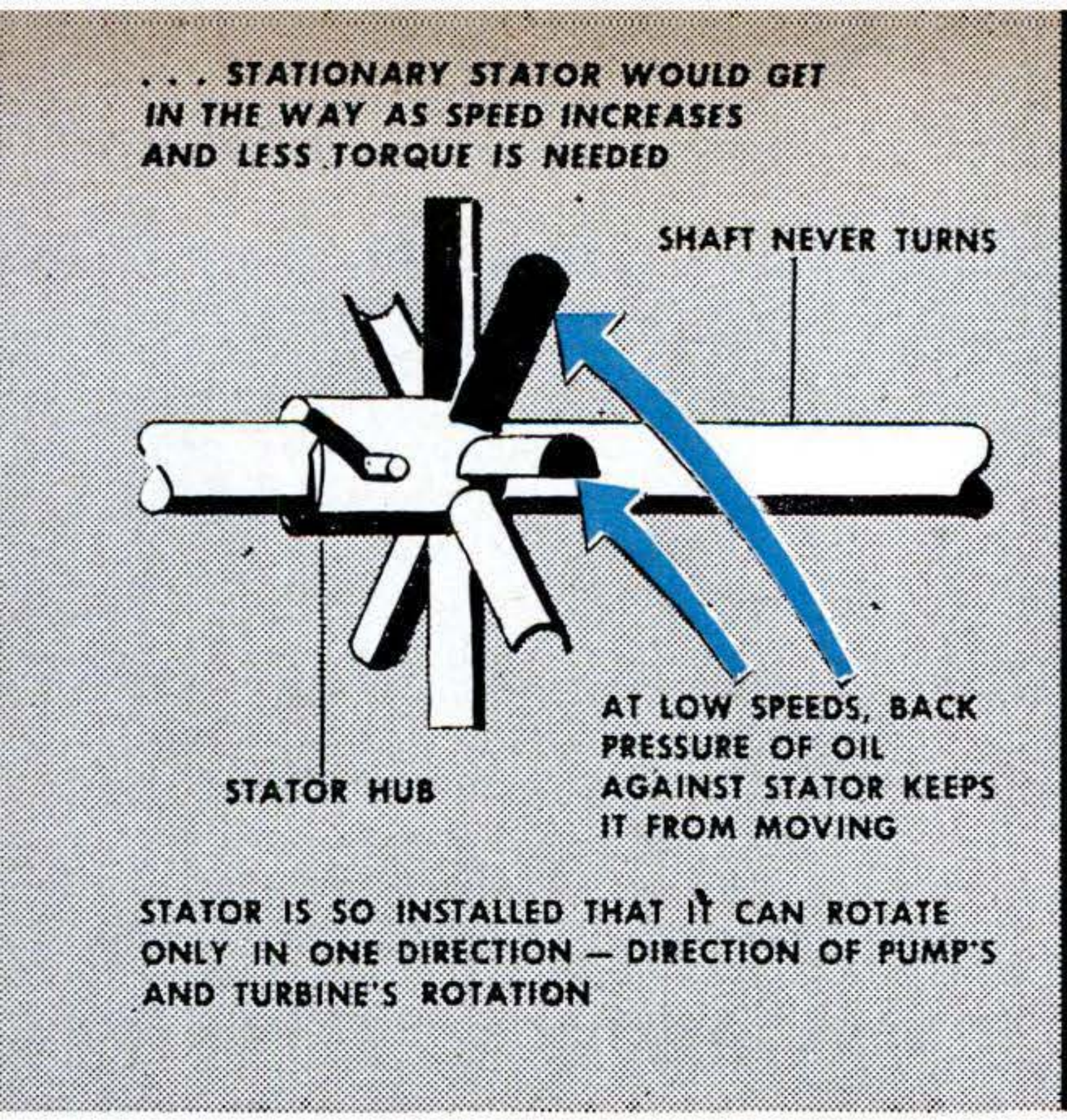
High Speed a Problem

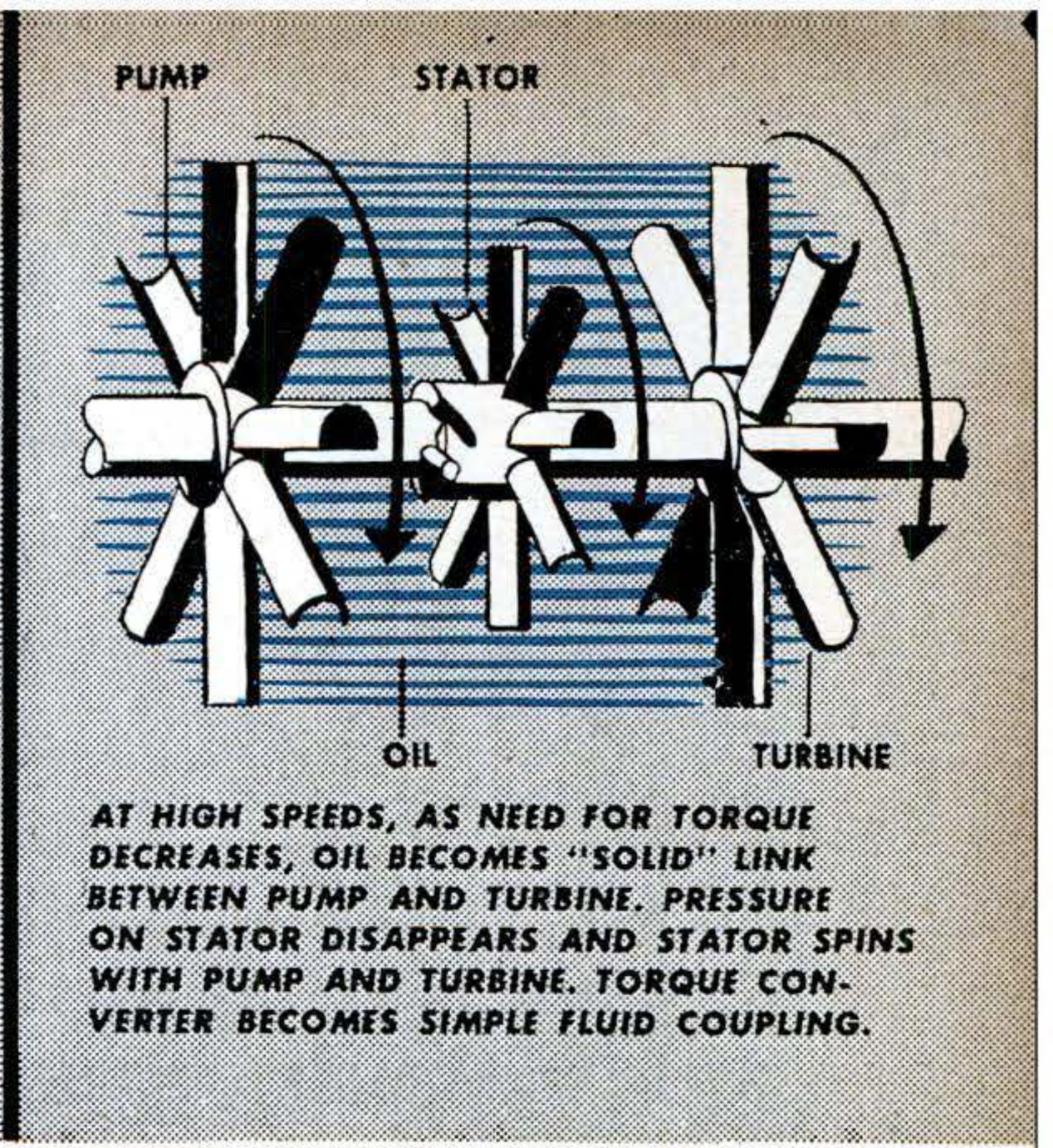
But torque converters for automotive use were something else again. When engineers began fiddling with torque conversion for buses and passenger cars, they discovered that while the device worked fine at low speeds, at the higher ones the vehicles required, the entrails of a torque converter would put the oil into an uproar. As the rotational speed of the converter grew and the flow of the oil became completely rotary, the stators were only in the way. Power losses were colossal, and the outraged oil got hot enough to burn.

Yet there had to be some answer to the problem. It would be ideal if the torque converter, efficient at low speeds, could be wedded to the simple fluid coupling, efficient at high speeds. If it could be done, the completely fluid transmission would be a reality.

For the engineers, the fluid coupling itself was like money in the bank. That much had been accomplished. While the oil in the coupling did tend to slap pettishly at the pump when the accelerator went down, it "solidified" so quickly as a car gained

Copyrighted material





speed that for all practical purposes it provided a mechanical connection between engine and rear wheels.

The question was: What to do about the stators? What finally happened was forecast in POPULAR SCIENCE in its December, 1945 issue (pp. 144-45). The stators were mounted on a wheel that could turn *only one way*—in the direction that pump and turbine rotated.

That, in essence, is the new Buick transmission. So long as the torrent of oil needs

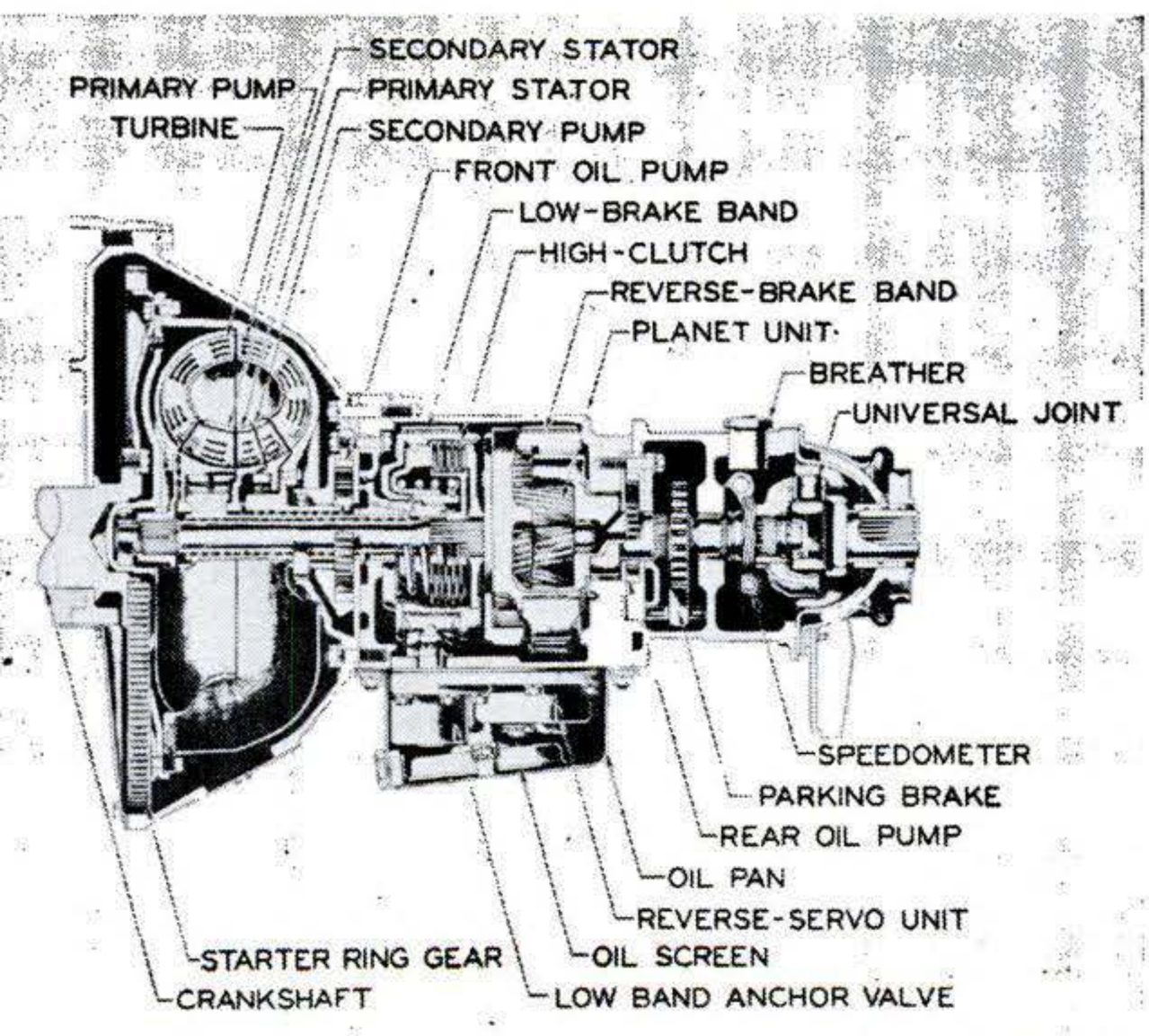
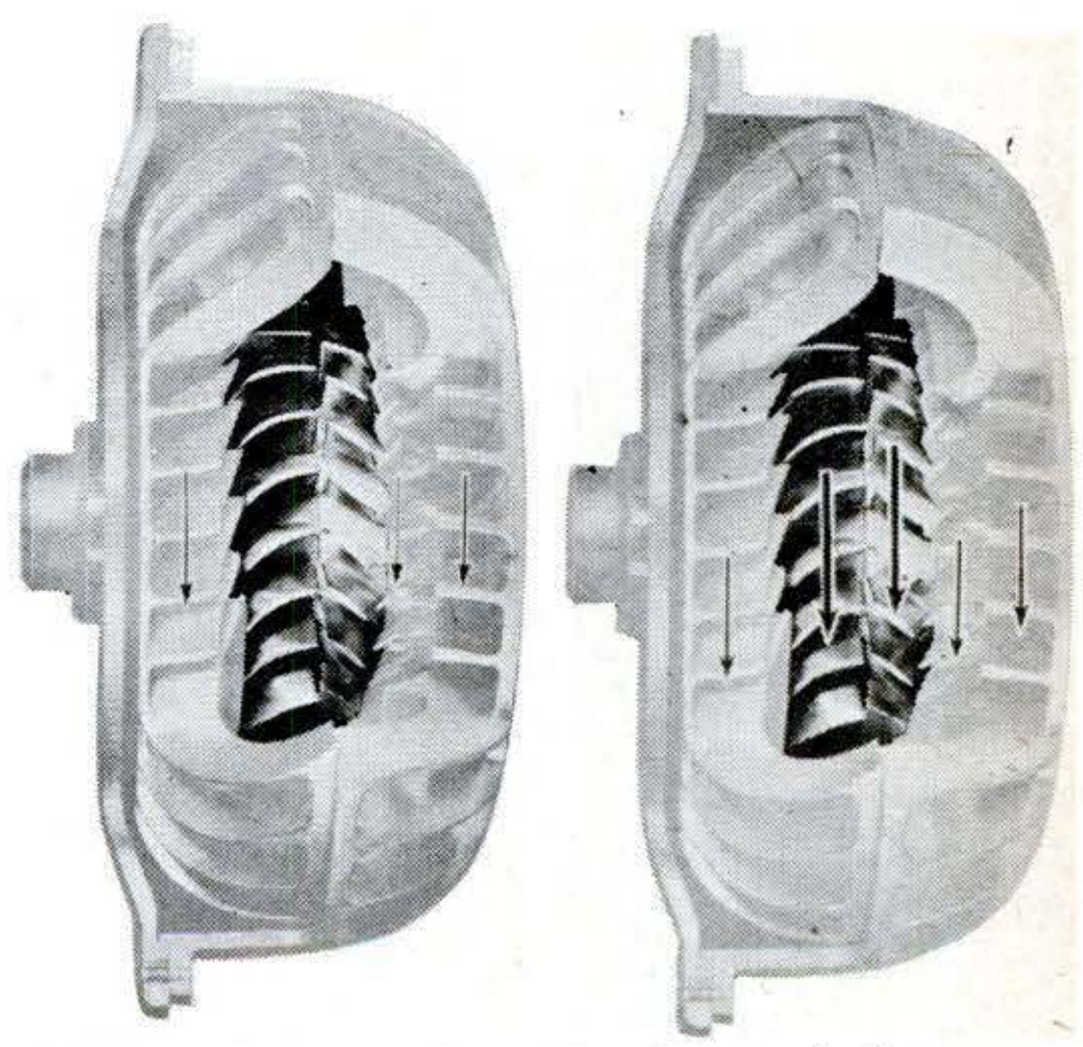
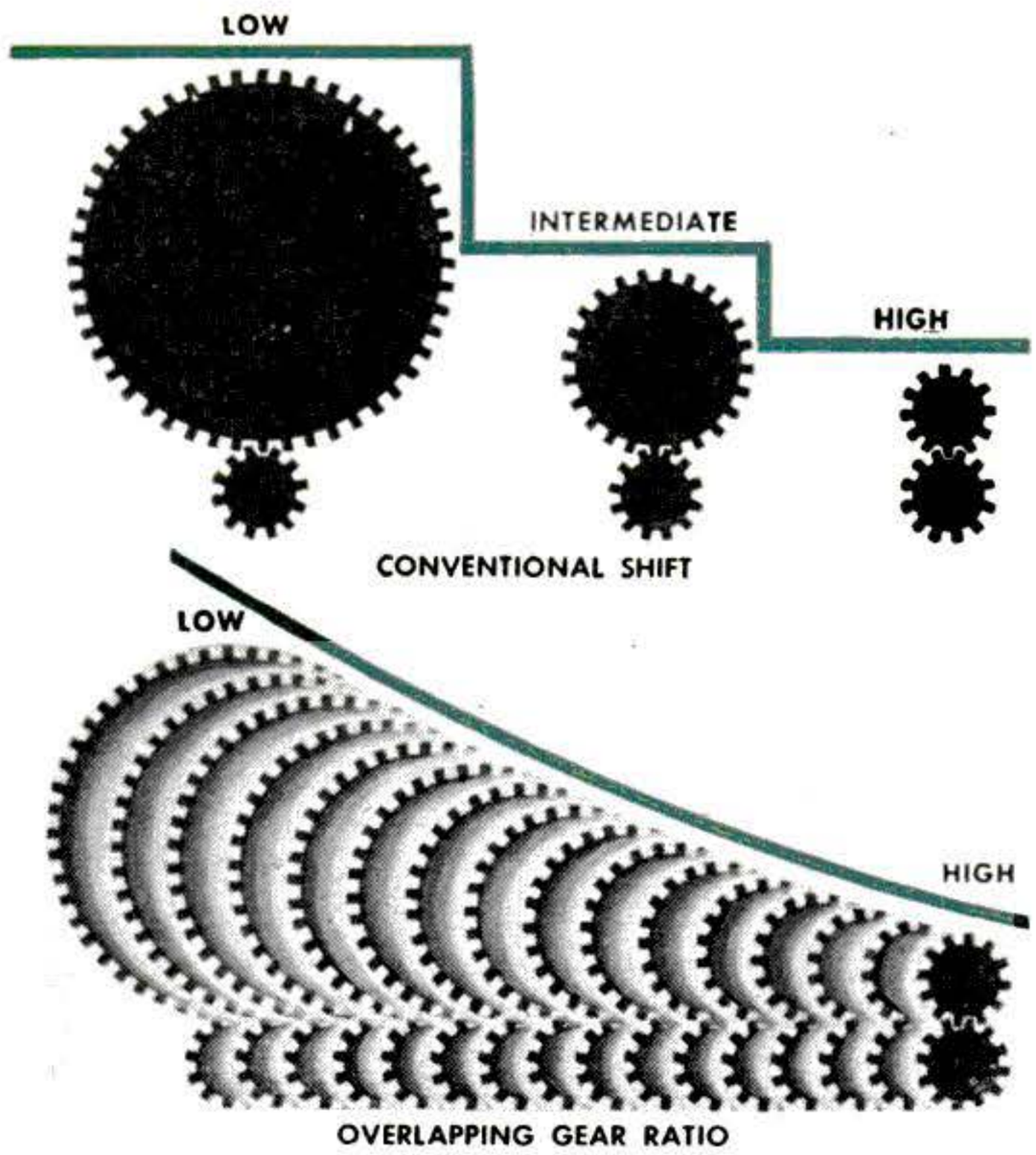


Diagram of Dynaflow transmission reveals that turbine that drives the wheels is at end nearest the engine, while engine-driven pump is behind it. This seeming contradiction is most efficient way to fit them in. Buick claims adequate engine brake when coasting as a result of the fact that the turbine then acts as a pump, and the pump as a turbine. Company cautions to push, not pull, car for emergency starting; otherwise it may accelerate suddenly into rear of tow car. While car is pushed, control lever should be left in neutral until 30 m.p.h. is reached.



Phantom views show the heart of the torque converter. In each, from right to left, are the primary centrifugal pump, secondary centrifugal pump, the two stator assemblies (darkened), and finally the turbine. Arrows on left drawing show what happens as car starts: pumps and turbine revolve in same direction; stators remain fixed. Right drawing shows action at high speed: as marked by arrows, the two stators start free wheeling in the same direction as the pumps and the turbine. The device now acts entirely as a simple fluid coupling.

Copyrighted material



Dynaflow torque conversion supplies the motorist with a "million gear ratios" instead of the conventional three, because the gradations in torque, or push, at the rear wheels are infinite.

redirection, the stators stand their ground. They give a helping hand to the pump. The oil they feed the pump supplies torque multiplication, just like the conventional automobile transmission gearing.

The pump declares its own dividend. When it needs a lot of help, it gets it. Through the turbine, it passes the added crankshaft twist on to the rear wheels of the car. As the car gets rolling and the speed of the turbine begins approaching that of the pump, the stators experience less pressure. The rear wheels demand less push. Less oil flows from pump to turbine and back from turbine to pump. Torque multiplication drops off. Presently there is no pressure at all on the stators. They float, revolving freely with pump and turbine.

The automobile's transmission, as such, disappears. Pump, turbine, and stators become a simple fluid coupling.

Buick is not the first to use the floating stator. It was introduced on buses shortly before the war. But Buick is the first to refine the system for mass-produced high-speed passenger cars. Because emergency low and reverse require mechanical gearing, the Buick transmission as yet is not completely fluid. And as yet it is only optional equipment on the Roadmaster model. It costs more.

Hydraulic torque conversion in principle is not too complicated. It is extremely complicated in application. Buick's stators are arranged in three stages. There is not one centrifugal pump but two, and the secondary pump over-runs the primary in certain load conditions. Two gear pumps are required to maintain oil pressure at various car speeds. A radiator is necessary to drain off excess heat from the oil. The system has a lot of other accoutrements.

Buick is worried about getting an adequate explanation of torque conversion over to the public. If a man has to pay extra for something, he wants to know how it works. Buick must face up, also, to a slightly higher fuel consumption in the present state of the art. As for servicing, that will be a problem in itself for some time. Buick smartly began schooling its dealer repairmen in torque conversion transmissions two months ago. The wayside garage man is in for some midnight study.

Smooth and Flexible Ride

But listen to an expert describe torque conversion. Carl A. Lindblom, chief engineer of the White Motor Co., pioneer in the field, says: ". . . it offers torque multiplication and automatically provides a smooth, flexible ride comparable to the result that would be achieved if infinitely minute progressive gearshifts were manually possible."

That means pressing on the accelerator is like opening the throttle on a locomotive.

". . . It permits the power plant to operate in its most efficient output range. It eliminates low-speed lugging and chugging in the critical detonation. (No ping.) As a result, better spark timing and higher compression ratios are possible . . . Vibrations of the engine and drive train are isolated and subdued. (Feels like sitting in your easy chair at home.) Vehicle life is extended, driver effort decreased, and passenger comfort increased."

That means that an automobile with a torque converter feels like an airplane in smooth flight. END

Mike Blares Umpire's Decisions

So THAT baseball fans in the bleachers will know the umpire's decision, Chas. H. Capp, of Philadelphia, has invented a small microphone to be mounted inside the umpire's mask. Wires run to studlike terminals fastened to the sole of his shoe. When the umpire steps on a sunken contact block behind home plate, his voice is heard over the ball park's loudspeaker.

Copyrighted material

Sand Sinks Oil Slick

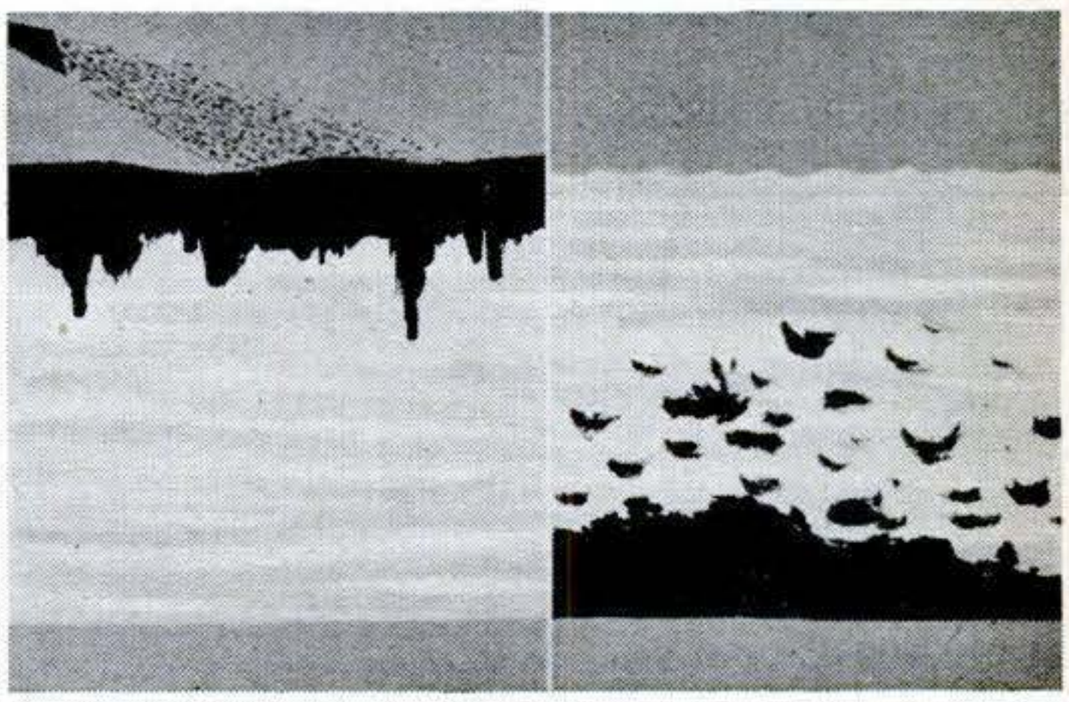
LATEST thing in fire-fighting is a novel method that puts out harbor fires caused by burning oil slick by literally sinking the oil right out from under them. More important, it removes the cause of such fires before they happen. Primarily a preventive, it was developed by the Navy following a serious oil-slick fire at Norfolk, Va.

Fine beach sand, heated to 700-800° F. in a revolving drum with a mixture of carbon asphalt and fuel oil, is coated with a layer of carbon. When this is sprayed on the slimy, highly inflammable slick, the carbon, having an affinity for oil but repelling water, adsorbs the oily scum, which is then carried to the bottom with the sand.

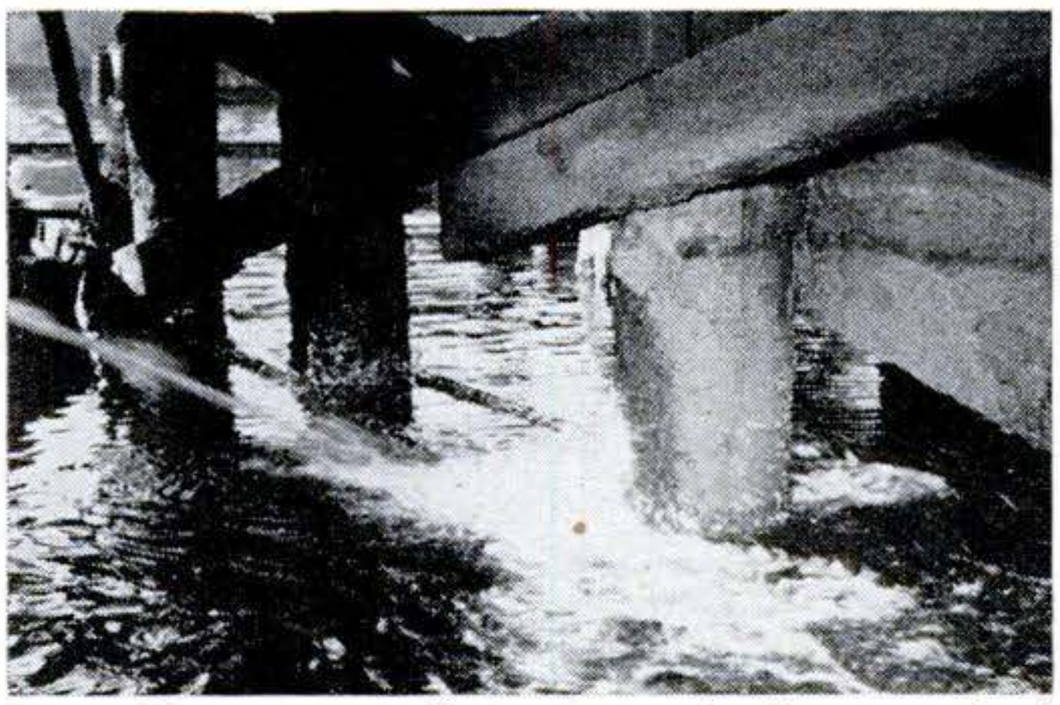
In addition to being inexpensive and easy to use, the carbonized sand can be sprayed around pilings and between ships, thereby reaching oily spots hitherto inaccessible.

Carbon-coated sand is poured into a standard sand-blasting pressure tank. A portable compressor can be mounted in a power boat for treating oil slicks under piers and off shore.

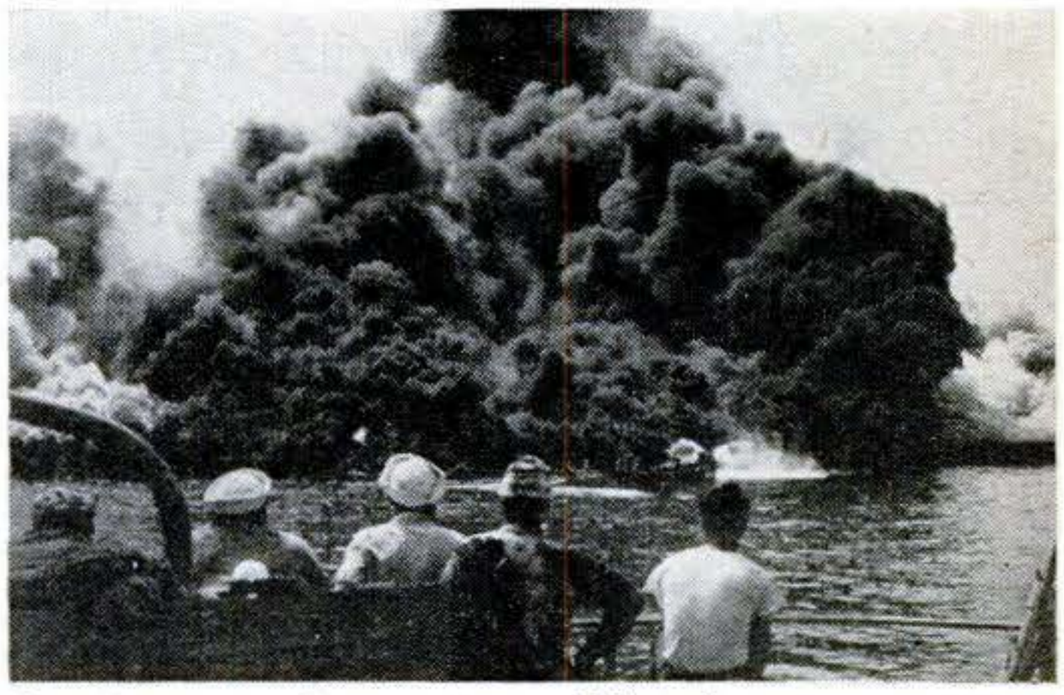
The sand is blown onto the slick under an air pressure just high enough to let it float without being driven through. About a half pound of sand will treat a square foot of surface.



The carbonized sand acts as a coagulant, clotting the slick into heavy, sand-laden lumps (above, left) that slowly settle to the bottom (right). Even if disturbed, they will sink back.



Sand blast scours slime-covered pilings, is ideal for such hard-to-reach places. Oil-covered, creosoted wooden piers, often inaccessible, have been the starting place for many a disaster.

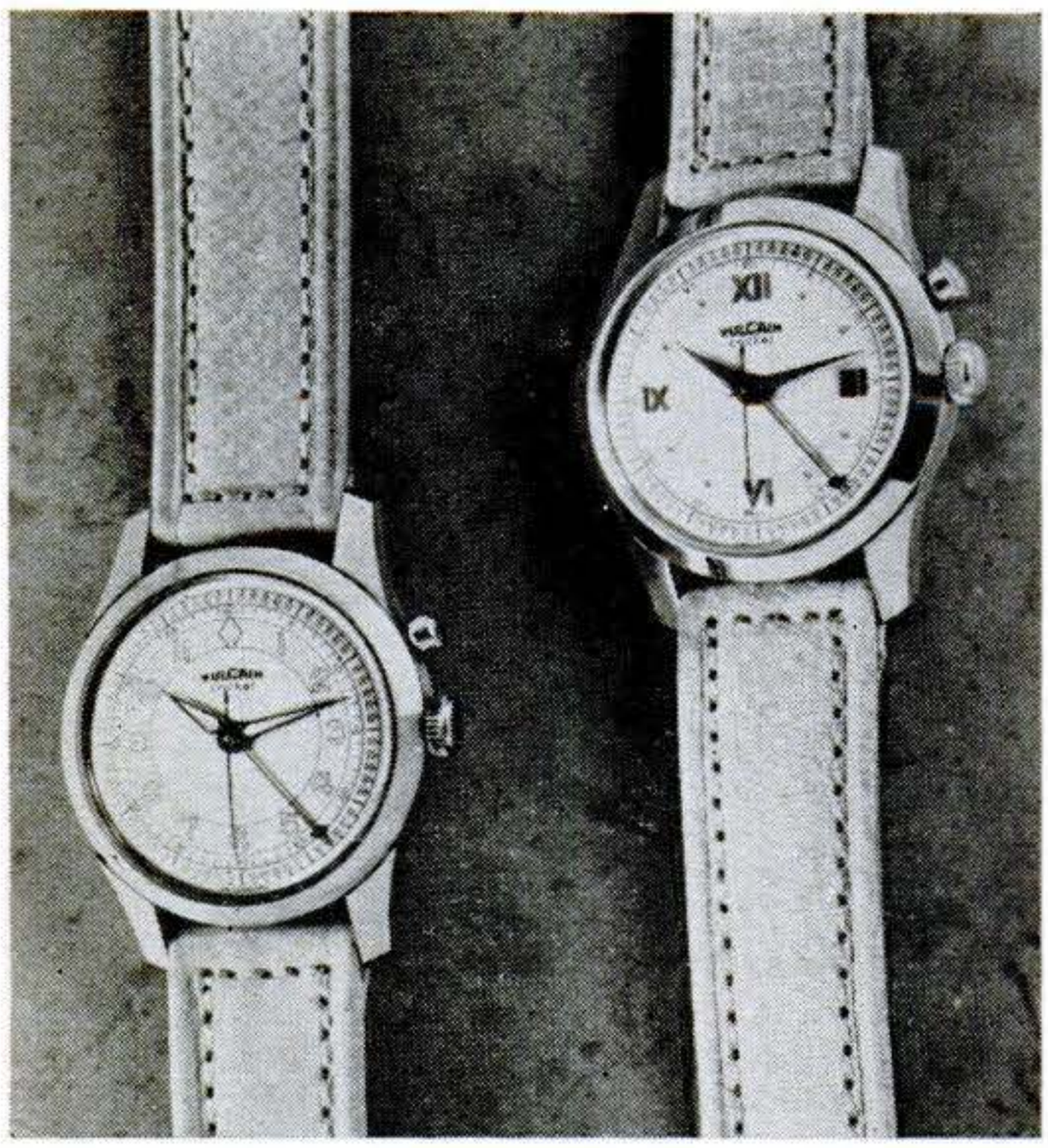


Costly waterfront fires, like this one at Norfolk, Va., may now be a thing of the past. In a recent Naval test here, 6,000 square feet of slick were treated and removed in four hours.

Copyrighted material

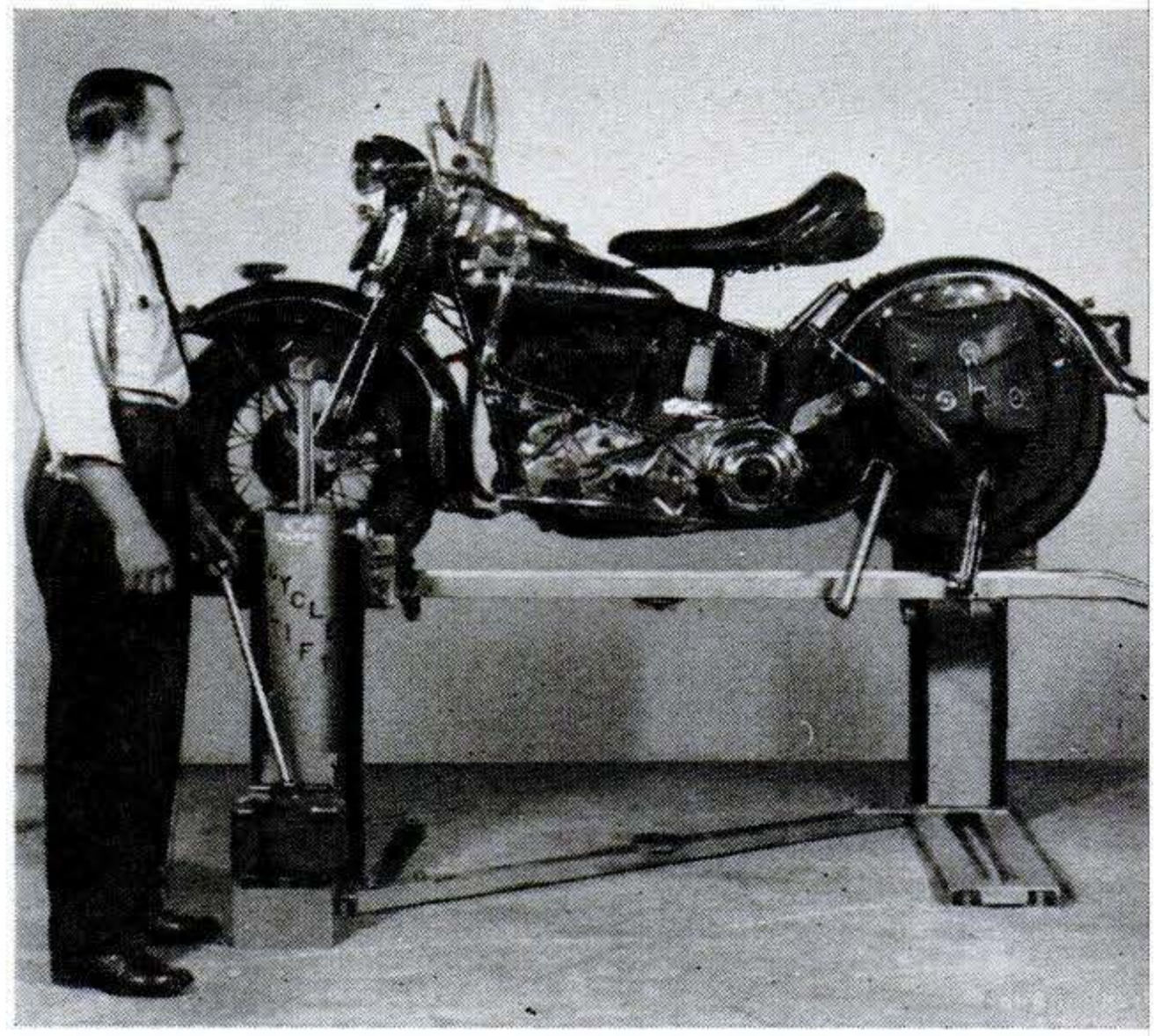
Ball Bearing Midgets

THE needle of a hypodermic syringe is the oil can that lubricates these tiny, nonmagnetic ball bearings. Claimed to be the smallest of their kind in the world, they have been developed by New Hampshire Ball Bearings, Inc. The bearings are made of noncorrosive beryllium copper, and are expected to find wide usage in electrical, electronic, and industrial fields where freedom from magnetic influence is a factor.



Wrist Watch that Rings

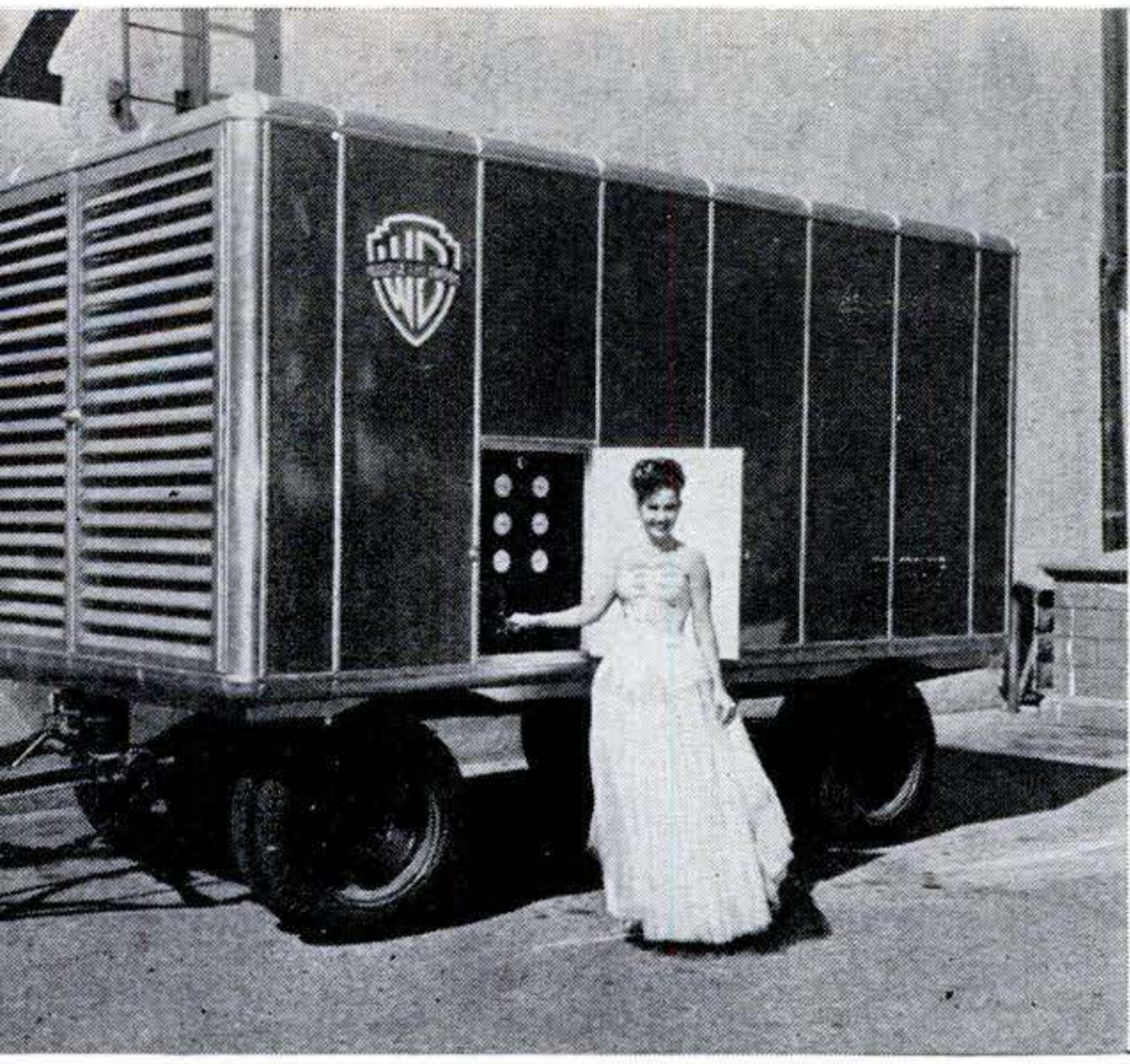
CRICKET is the name for this alarm wrist watch because the prowess of the tiny chirper of nature shamed Swiss designers into licking the problem of making a small precision timepiece sound off. The trick was done by setting a tiny steel peg in the center of a thin diaphragm at the back of the watch. A hammer, part of the movement, hits the peg, producing a noise loud enough to waken a heavy sleeper. Made by Vulcain, the watch above, at left is made of stainless steel; the one at right is of gold, with raised gold numerals. Button next to the regulation winder controls the alarm mechanism.

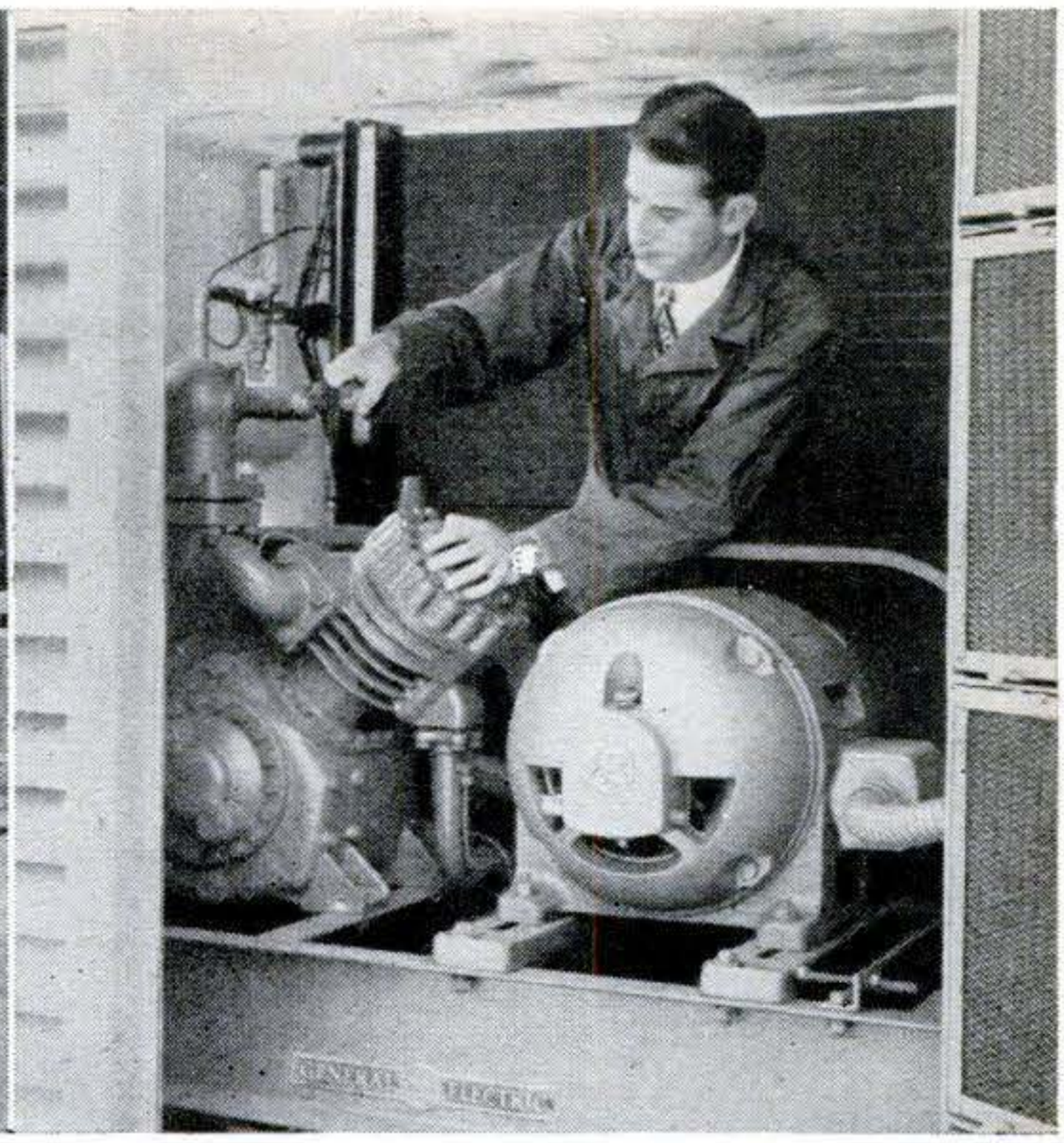


Motorcycle Gets Uplift

CATERING to two-wheel road jobs, this new hydraulic lift hoists a motorcycle to a working height and holds it firmly in place while the mechanic does an overhaul job from a sitting or standing position. The obvious advantage is that it eliminates stooping or kneeling while doing repair work. Holding arms that clamp to the frame of the machine are adjustable. Another product of the Thoro Corp., of Batavia, Ill., is the collapsible windshield shown on the motorcycle above. Rolling into a chromium tube, the shield works like a window shade, and can be raised and lowered as desired.

Copyrighted material

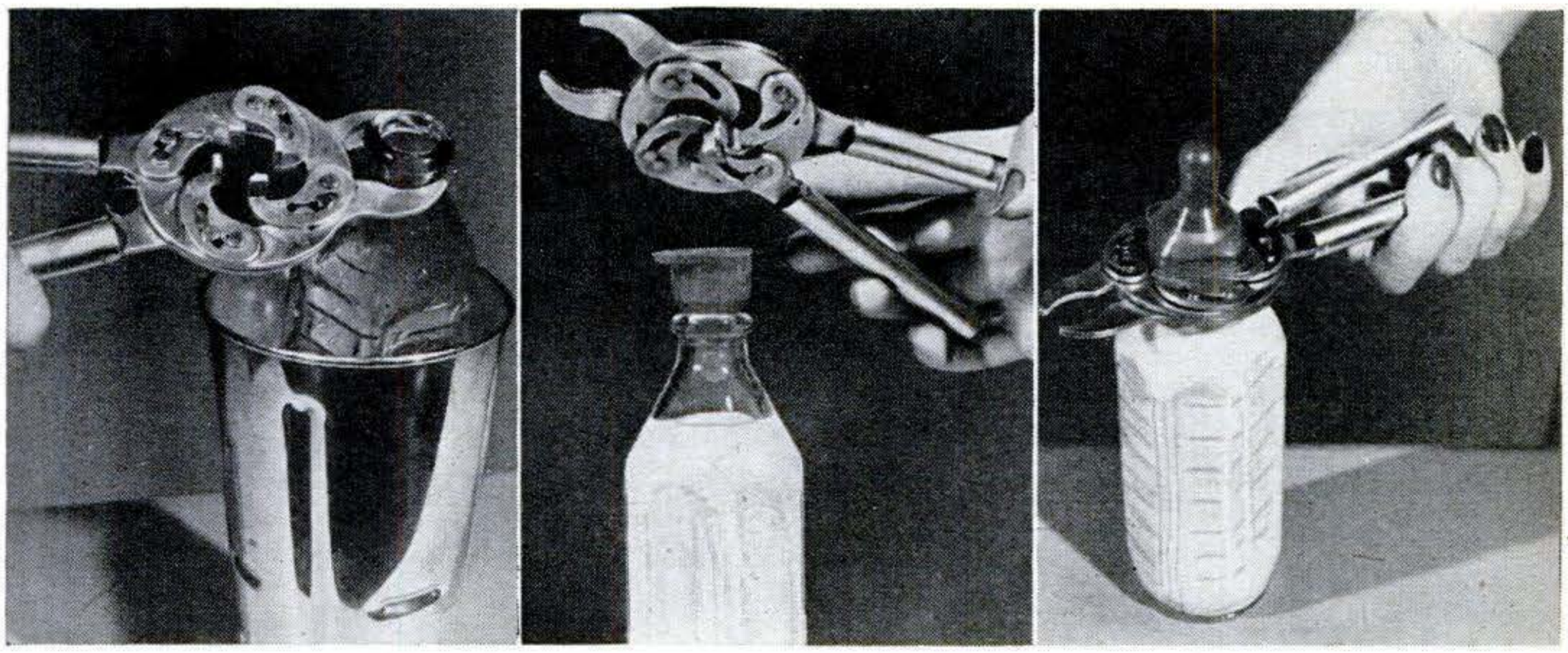




Cooling Off the Cast

TEMPERATURES must be kept down on Hollywood movie sets or temperaments will soar and makeup will melt. On a Technicolor stage, the thermometer will rise to over 100°, even on a winter day, unless something is done about it. Latest wrinkle in keeping the stars smiling and their powder dry is a mobile air-conditioning unit, shown above, at left, mounted on a small trailer.

Developed by C. G. Hokanson Co., of Los Angeles, one unit will lower the temperature as much as 25° over an area as big as a town lot. Adjustable vents enable the operator to direct filtered, cooled air up toward the hot lights, or along the floor so that no air motion is present when action is being shot. Engineer at right, above, is adjusting a Freon water-cooled compressor. A 30-hp. GE condenser serves the two air conditioners of each unit.



Nipples Slip On Easily

BABY can almost put the nipples on his own bottle with the Nipple On, made by Denlows Instrument Co., Jersey City, N. J.

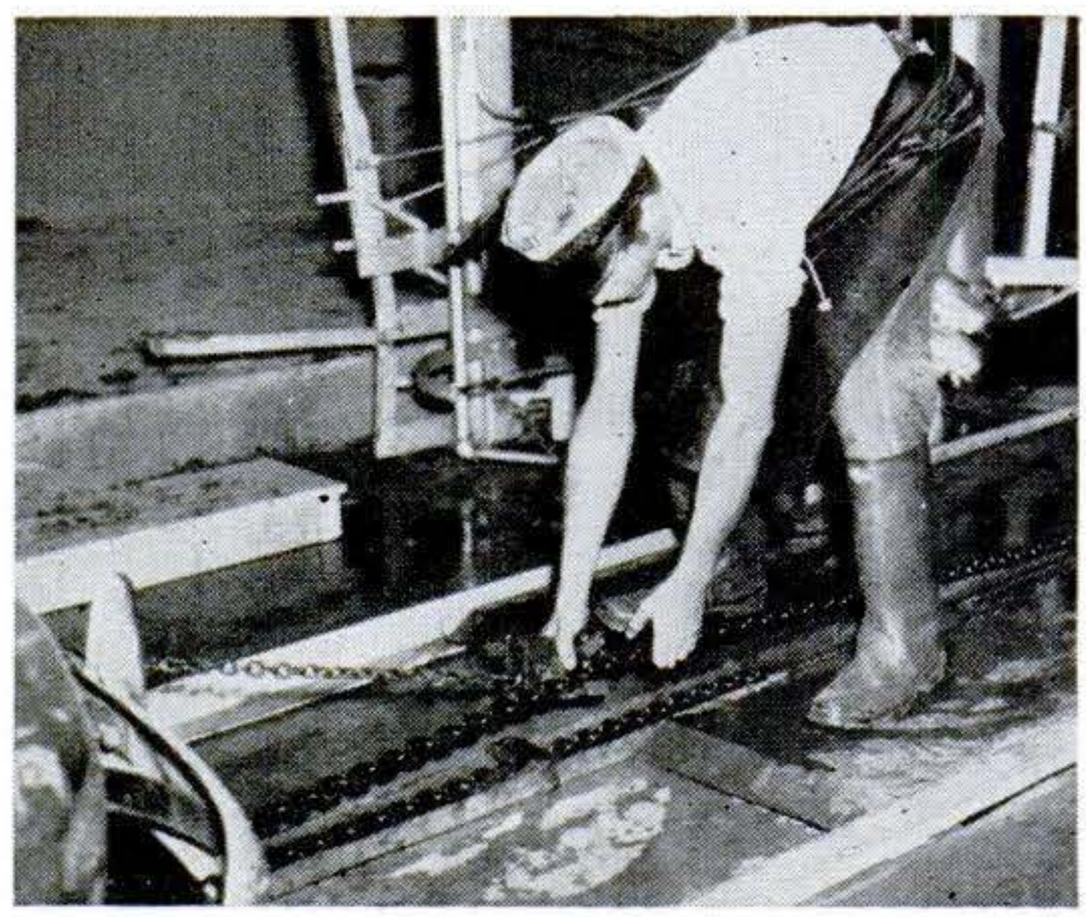
Designed to let harassed parents change nipples without having to touch the bottle or running the danger of spilling it, the device has tongs for removing the heated bottle from the sterilizer (as at left, above). Four smaller prongs on the side are then inserted in the nipple, placed upside down in the bottle (center), and the handles are pressed together. This spreads the prongs apart, allowing the nipple to be picked up, turned over, and pulled down over the neck of the bottle (right). The prongs are then slipped out from under and removed.

Copyrighted material

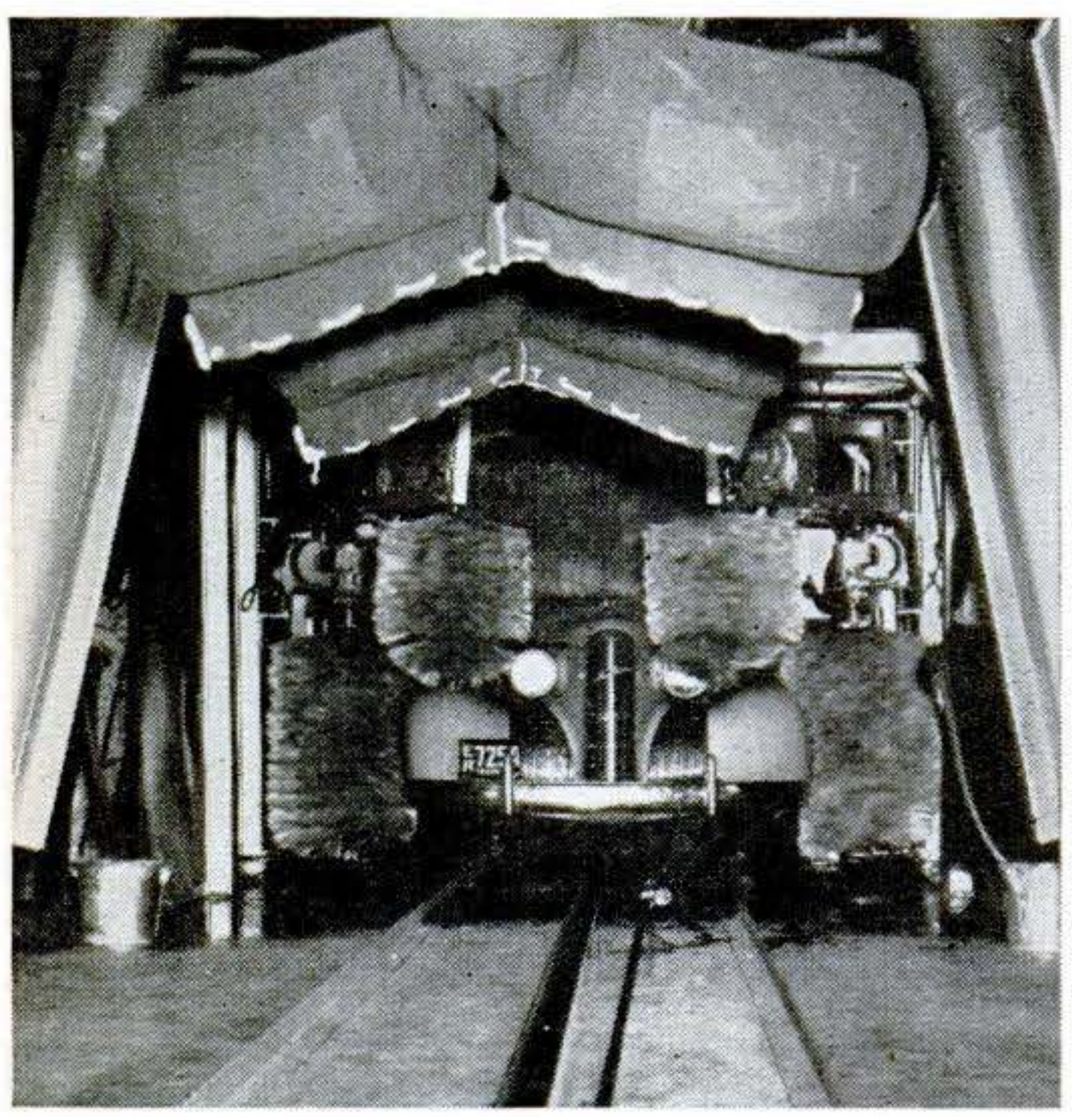
How Cars Are Washed In Fast New Laundries

NOW you can have your car vacuumed, washed, and polished in less time than it takes to read this article. If you are in a hurry, you give your key to an attendant, walk to the cashier's window, and by the time you get change from a five dollar bill, your car, spick-and-span, is waiting to be driven off. More leisurely customers can leave their cars in an adjoining parking lot from which they are picked up to fill in the laundry's slack time. But even harried motorists often stay beyond their own three-minute car wash time to watch the spectacular blower-drier (PS, Feb. '47, p. 79). Made by Minit-Man Car Wash, of Detroit, Mich., the system is operating in many big cities.

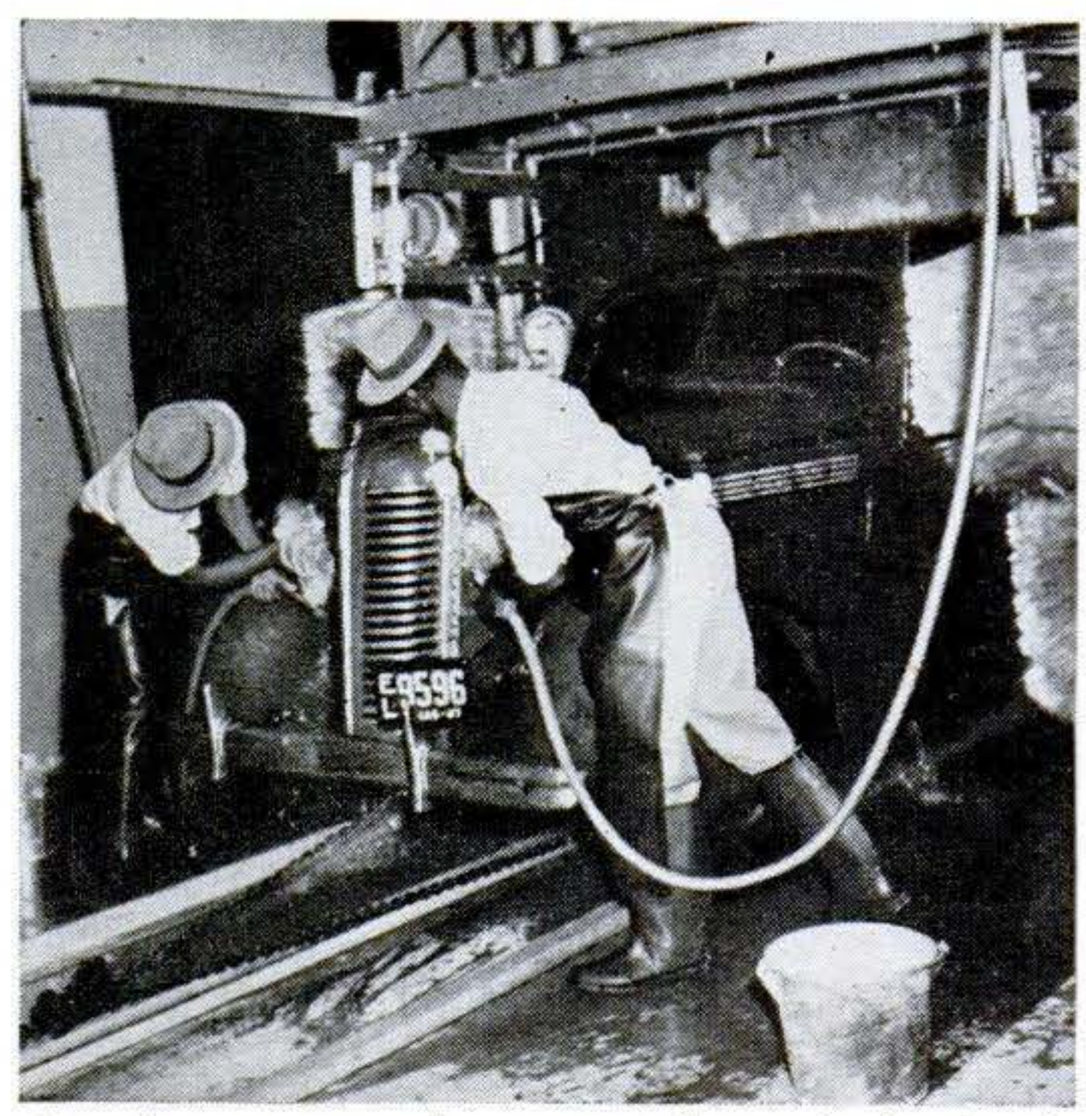
Attendant using vacuum cleaner gives the car's interior a thorough going over. He then checks the whip antenna before sending the car on its way to the mechanical laundry.



Bumper of a car is hooked onto a 75-foot conveyer chain that moves along the center of the floor. At the end of its brush, blow, and wipe trip, the chain is automatically disengaged.

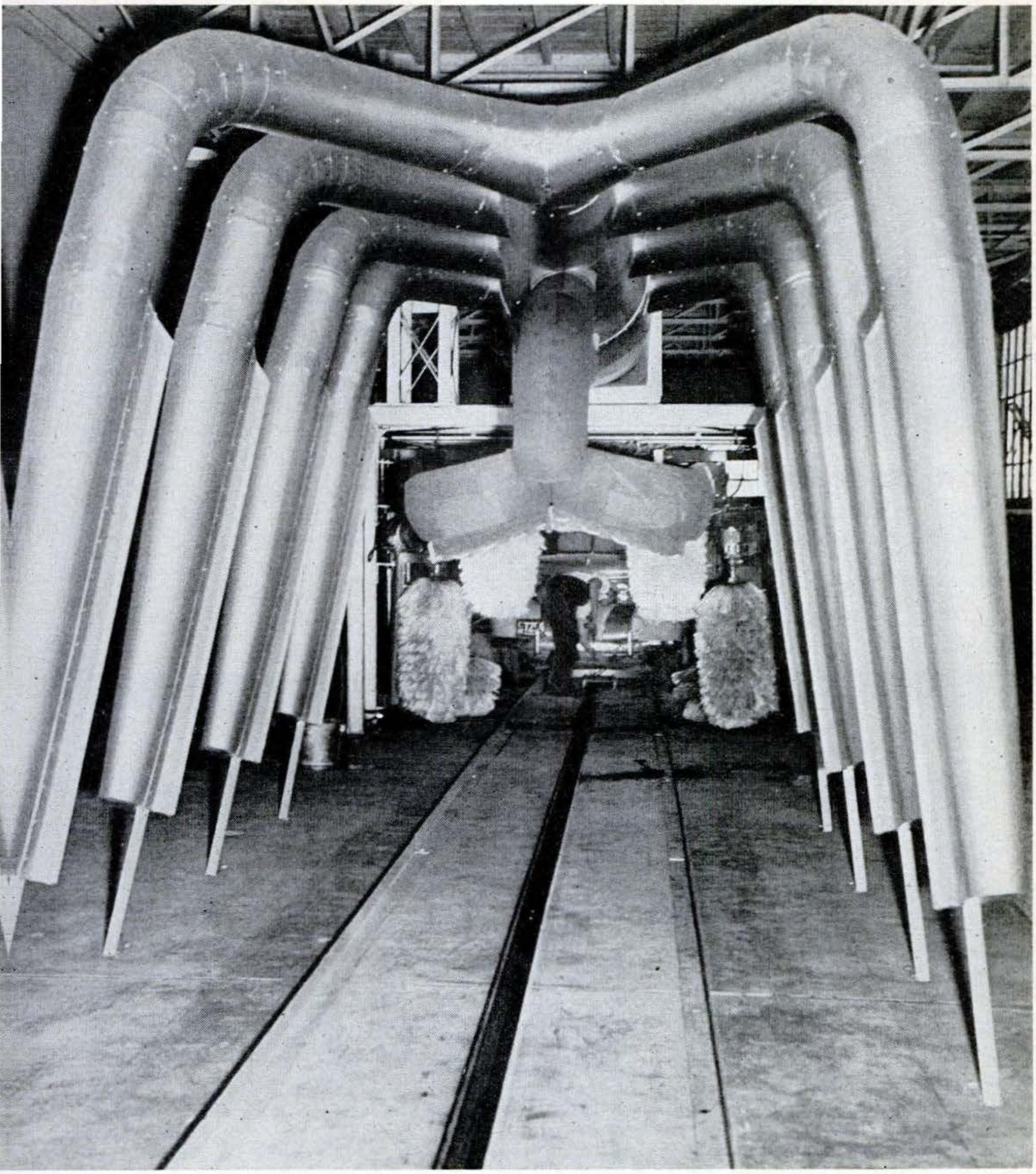


Here the car gets the brush-up. Seven brushes, made of soft fiber that will not scratch, completely envelop the car. Canvas spray ducts on top are lined with soft sheepskin fleece.



Touch-up men take over and attack the hard-to-get-at places, such as bumpers and radiator grille. The wheels, spun by a rotating treadmill, already have been cleaned by the brushes.

Copyrighted material



Straddling the laundry-line exit like a giant spider, this drier does its job with the roar of a wind tunnel. With a 60-mile gale blowing over the car's surface, excess water is soon gone with the wind. Finishers, using white turkish towels, dry out any spots missed by the blower. Windows are then polished, and the car is ready. Total elapsed time: three minutes.

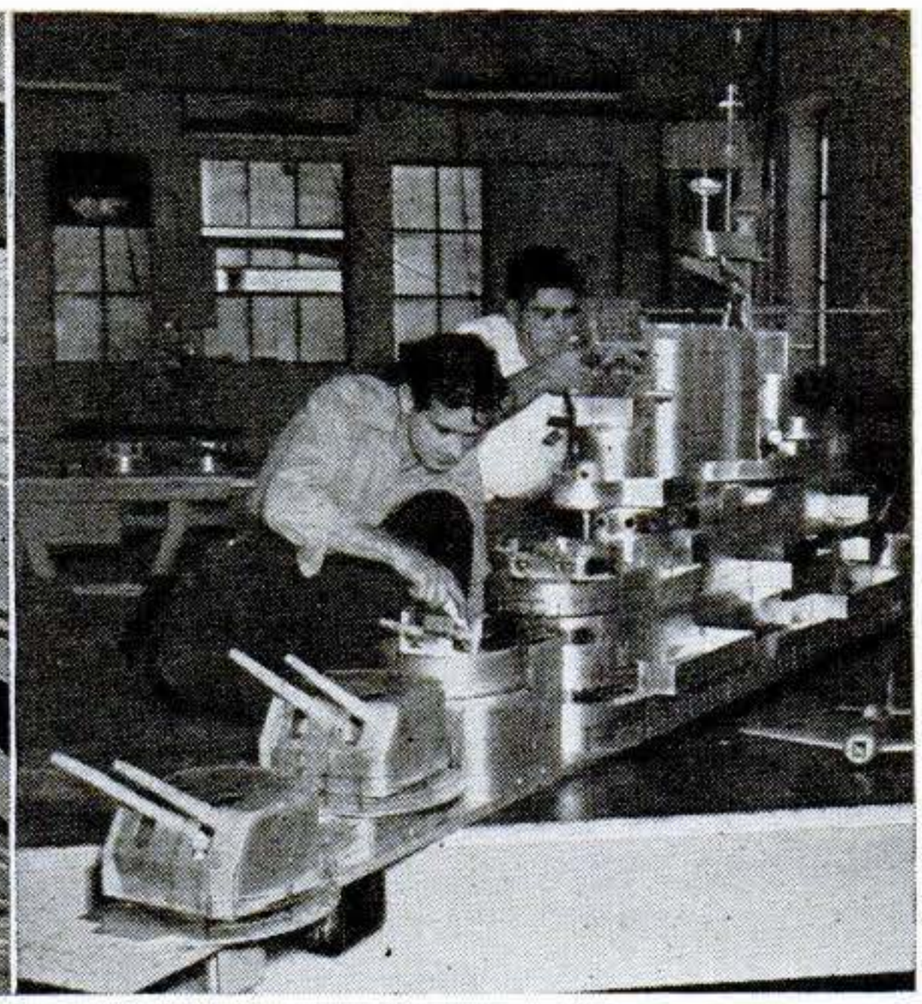
One Breath Equals Pint of Air

WITH each breath, the average man inhales enough air to fill a box three inches square and three inches deep. Breathing at an average rate of 16 times a minute, he takes in eight quarts of air every minute.

Hot Sun Means a Cool Earth

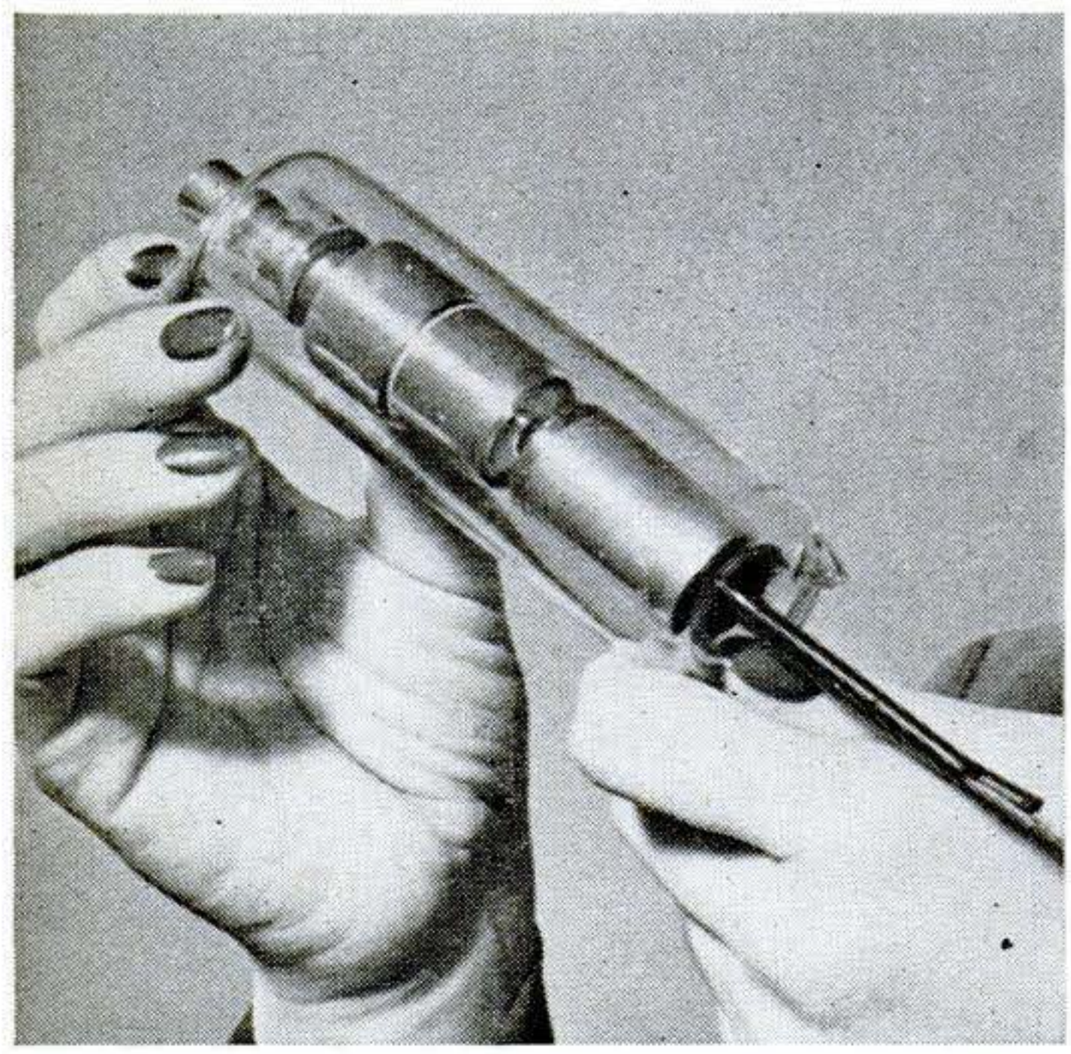
THE earth is coolest when the sun is hottest. At that time, the earth's atmosphere is stirred up, and the result is increased evaporation. This means more clouds and therefore more rainstorms, with resulting coolness.

Copyrighted material



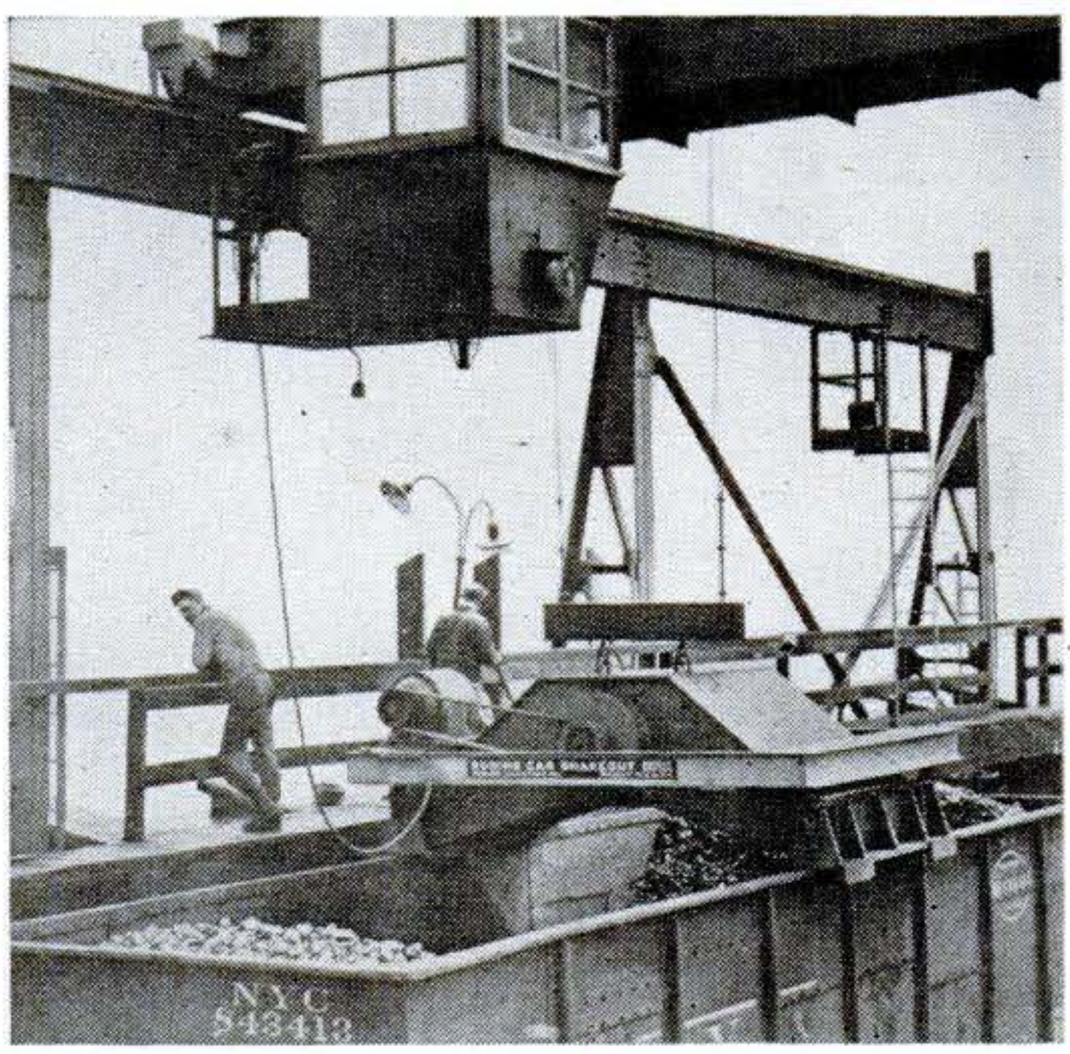
Land-Based Flat-Top

GUNS "fire" and plane propellers spin on this 44-foot scale model of an aircraft carrier. Used for recruiting, she puts on a realistic battle action. Recorded explosions are accompanied by puffs of talcum powder; an air compressor whirls the props of the tiny Wildcat fighters. Above, right, workers at the North Island Naval Air Station, San Diego, Calif., are putting the finishing touches on the superstructure, made of scrap aluminum. Electric motors elevate the guns and rotate turrets and radar antennas.



Tiny Tube Has Long Life

THIS new midget dental X-ray tube, although not much larger than the tubes in your radio, is expected to take a 70,000-volt beating for 20 years. New feature in the tube is a copper hood surrounding the anode, which minimizes stray radiation that might blur the film. The hard glass of a small window through which the X-rays are transmitted is ground to a thickness of 1/20,000 of an inch. Made by Westinghouse, the tube is an improvement over a similar German one captured during the war.



Shaking Out the Coal

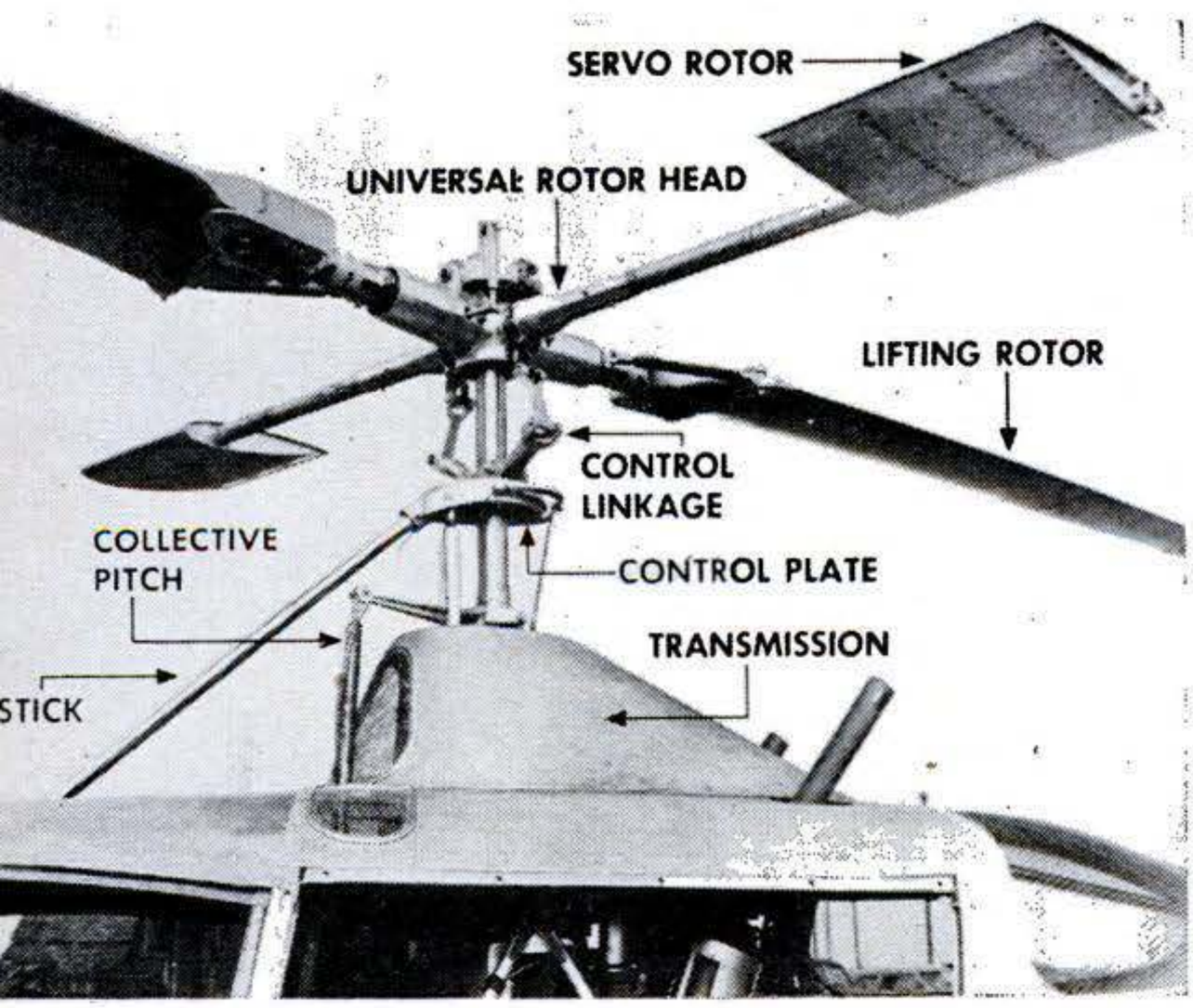
THE "big shake" straddling the coal car above sets up a miniature earthquake that avalanches a 50-ton load through the hopper bottom in about two minutes. Previously, from four to six men using sledge hammers and crowbars took as much as two hours for the job—and might damage the car. The shakeout, made by Hewitt-Robbins, Inc., of Passaic, N. J., is vibrated by the electric motor at left, and shakes the whole car. It is moved from one car to another by the five-ton hoist shown at top.

Copyrighted material

Helicopter Flies 'No Hands'

A BANE of helicopter flying has been the necessity of constantly manipulating the controls to keep the machine on an even keel. Airplanes would fly "hands off" but helicopters wouldn't. But now Stanley Hiller, Jr., of Berkeley, Calif., has produced a second version of his helicopter that will fly itself. (His first version was pictured in POPULAR SCIENCE, November, 1944, p. 90.)

The helicopter, called the Hiller 360 model, is "inherently stable." If it is put in a bank or glide and the pilot takes his hand off the control stick, the machine will return to level flight. United Helicopters, Inc., of Palo Alto, Calif., which young Hiller heads, claims that the 360 is the first rotary-wing aircraft capable of doing this.



The "servo" rotor, whose two blades look like two sections of a model airplane wing, is the secret of Hiller's new superstable copter. It controls the main rotor aerodynamically.

The stick of a conventional 'copter changes the blade pitch of the main (lifting) rotor by a multiplicity of push-pull rods. Hiller's operates, instead, two blades of a small control rotor. The control rotor, in turn, changes the blade pitch of the main rotor to control the attitude of the aircraft. In effect, the control rotors act as an aerodynamic "servo." It multiplies the pilot's manual control just as servo motors on a fixed-wing airplane boost the commands given in the cockpit in passing them along to the ailerons, elevator, and rudder.

A by-product of Hiller's system is the reduction of the amount of vibration in the control stick. Normally, considerable vibration is fed back to the stick by the rapidly rotating lifting blades. Hiller says his control rotor is self-damping, eliminating such vibration feedbacks.

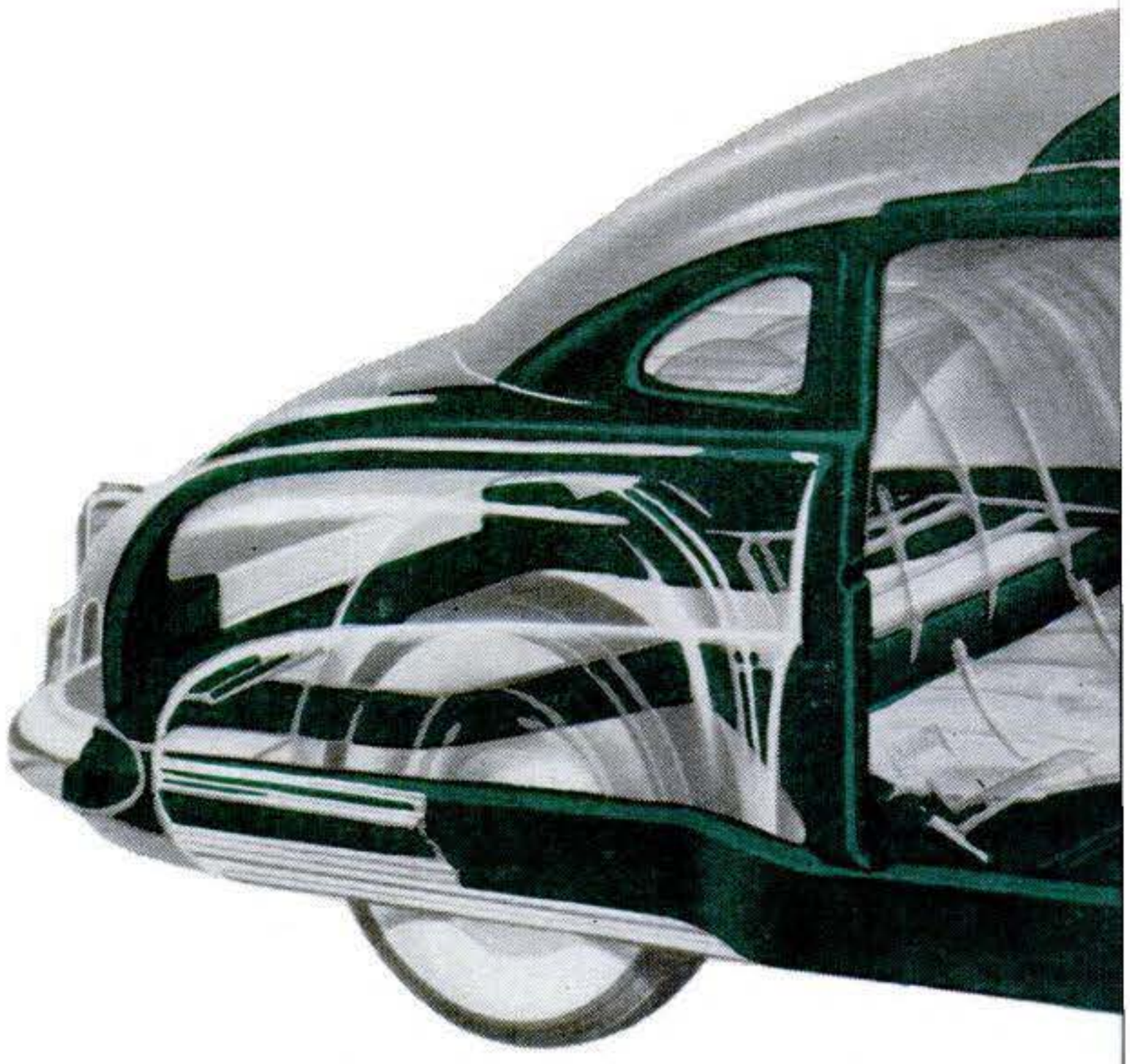
To connect his control stick directly to his rotor assembly, Hiller has replaced his between-the-legs stick with an overhead one (PS, Sept. '47, p. 93). Spring-balanced, the stick can be moved by a pressure of only 15 ounces. Like that of an airplane, it will always return to "neutral" when released.

The 360 has a high speed of 105 m.p.h., a cruising speed of 85 m.p.h., can climb 1,000 feet a minute, and can voyage 212 miles in still air between refuelings.

Copyrighted material

New Hudson Hugs the Road

Although the average man can look over the top, there's lots of room for the big guys in this low-slung car.



A single unit is formed by the body and frame of the new Hudson, the body panels being spot-welded to the frame structure. Notice that longitudinal girders are outside the rear wheels.

BODY and frame are one in the new 1948 Hudson—giving greater strength, rigidity, and passenger protection. Instead of an assembled body being bolted onto a built-up frame, the body and top panels are spot-welded to the horizontal and vertical members as shown in the phantom view above.

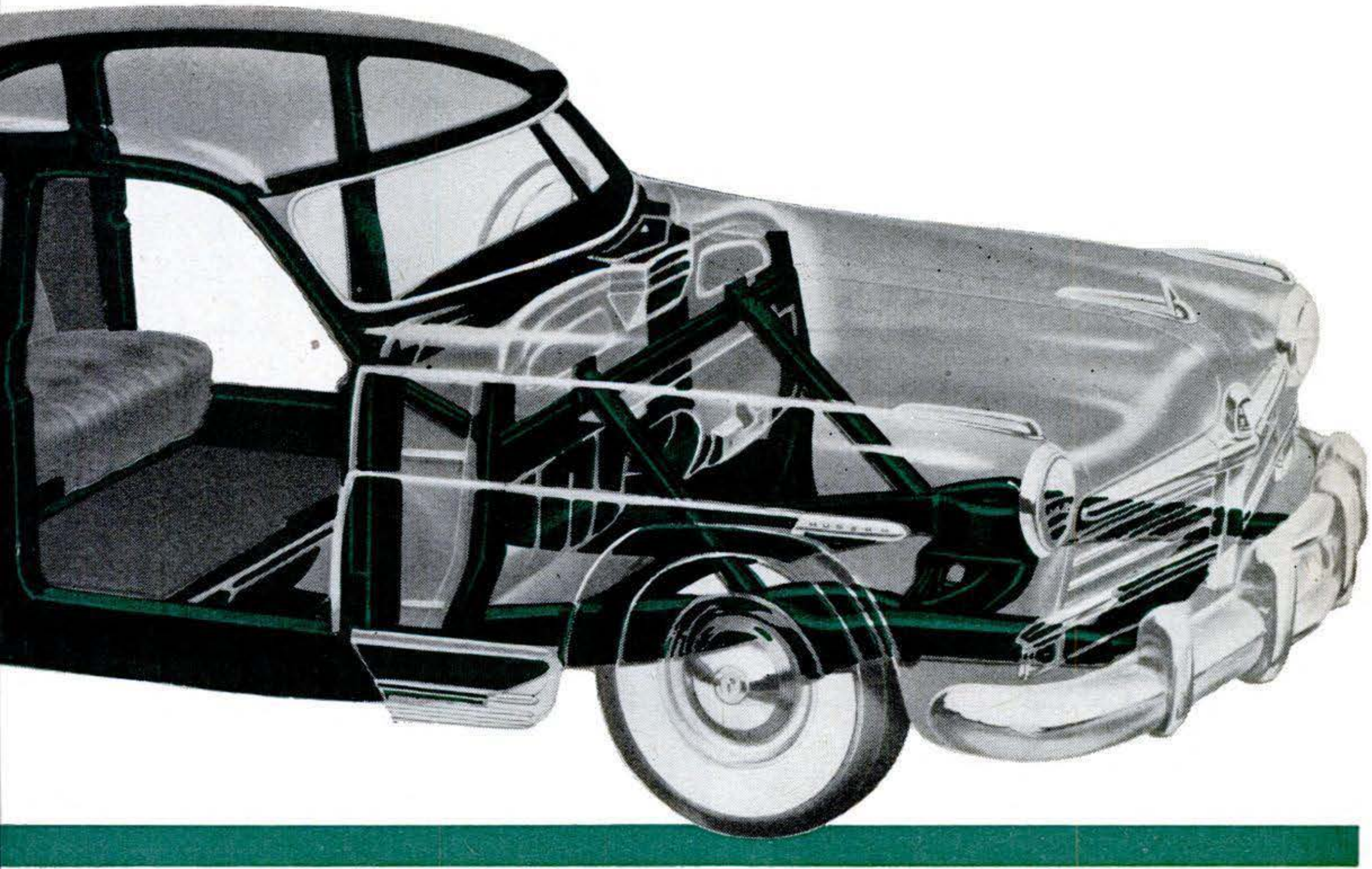
Going further than Nash and Lincoln, pioneers in the unified body field, Hudson runs the frame girders outside as well as inside the rear wheels, giving, in effect, invisible side bumpers. In fact, a large share of the $16,000,000 Hudson spent for current retooling was charged against this new body.

This all-steel Monobilt body-and-frame has enabled the company to turn out a car standing only five feet high, but with plenty of room for even the long-legged. By placing the floor under instead of over the frame (PS, Jan. '48, p. 133), Hudson engineers have come up with a low-slung car that has plenty of headroom, ample road clearance, and "the lowest center of gravity of any U. S. automobile." Engines of the new models have either six cylinders with 121 hp., or eight cylinders with 128 hp.

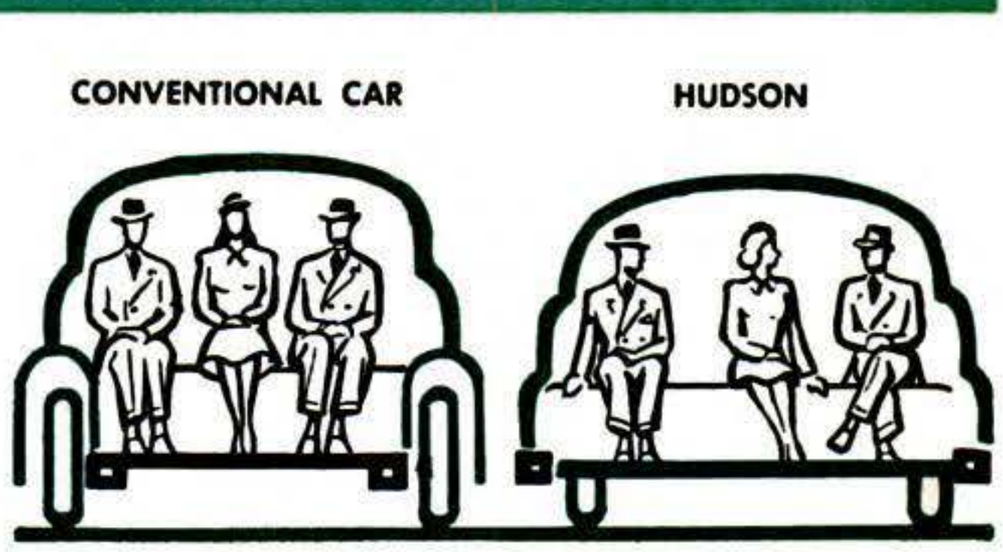
Tire changing is no problem, even though frame members are outside the rear wheels. With the car jacked up, the wheel goes under the girder after removal of a section of the chrome apron.

Space and comfort are both found in the rear seat. An arm rest for two persons folds down when needed, and recessed door controls give a full 66 inches of usable width inside the car.

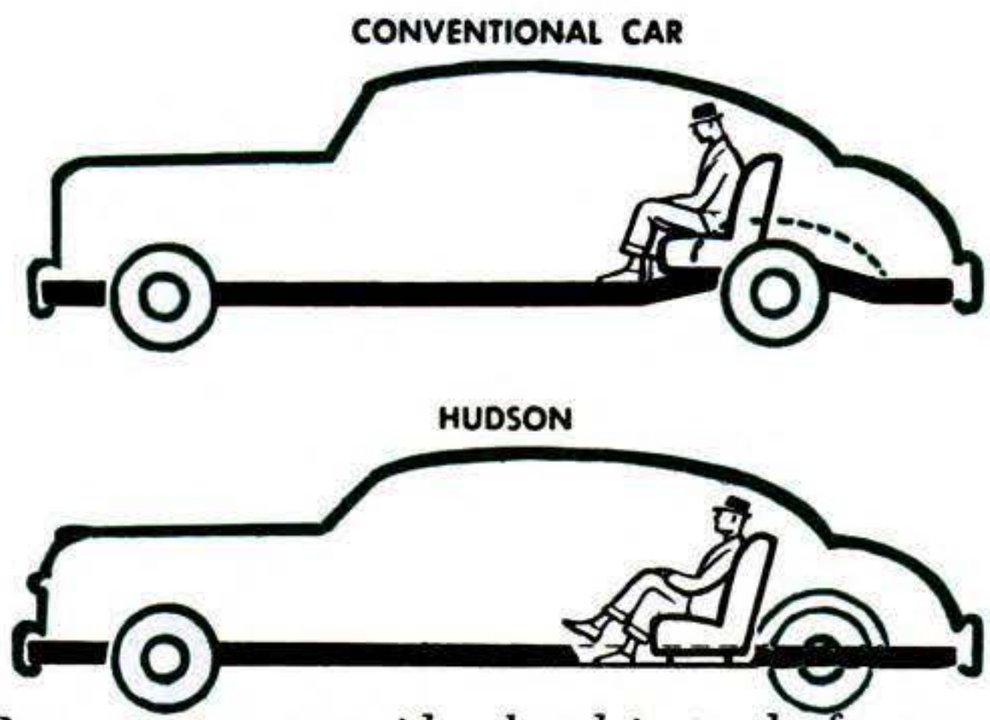
Copyrighted material



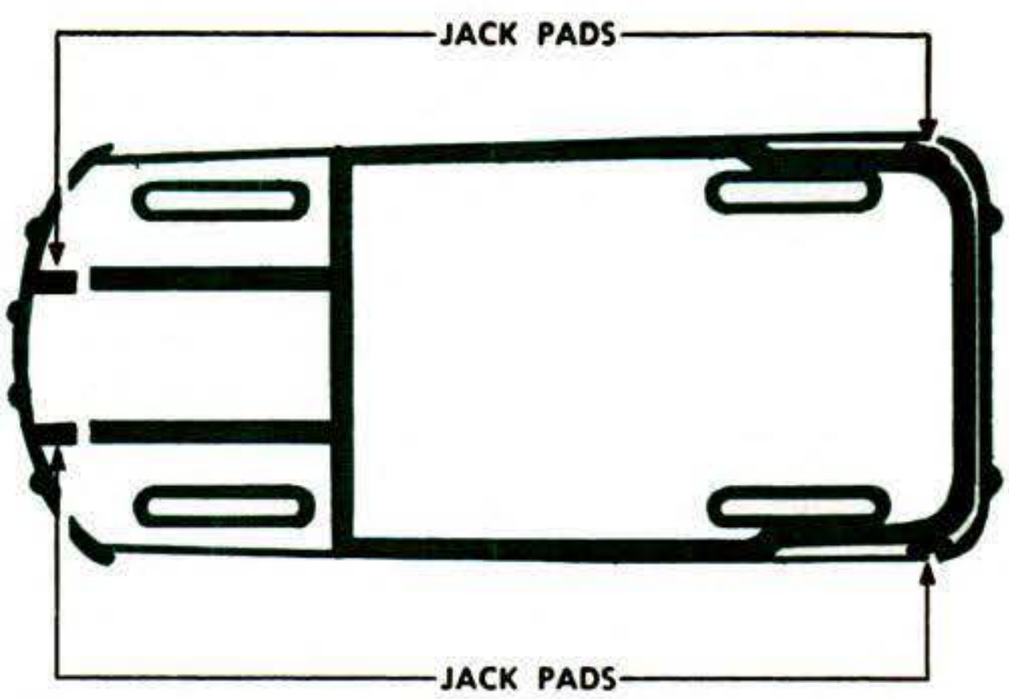
Reserve brakes provide extra safety. At point 1 the hydraulic system ordinarily gives full stopping power, but if you have to press the pedal to 2, mechanical brakes take over.



Since the floor is under the frame instead of on top, the Hudson has ample headroom, even though its height is only 60 inches. Over-all width of the new car is 77 inches.



Rear passengers ride ahead instead of over the wheels. To provide space for this, the engine was placed farther forward. The wheelbase is 124 inches; length, 207½ inches.



Box-type jack pads are found on the frame just behind the bumpers. Seated securely in these, the jack cannot slip. The rear bumpers are bolted directly to the frame of the car.

Copyrighted material

How to Run An Atomic Power Plant

Nuclear research piles give preview of methods that may be used to make tomorrow's electricity.

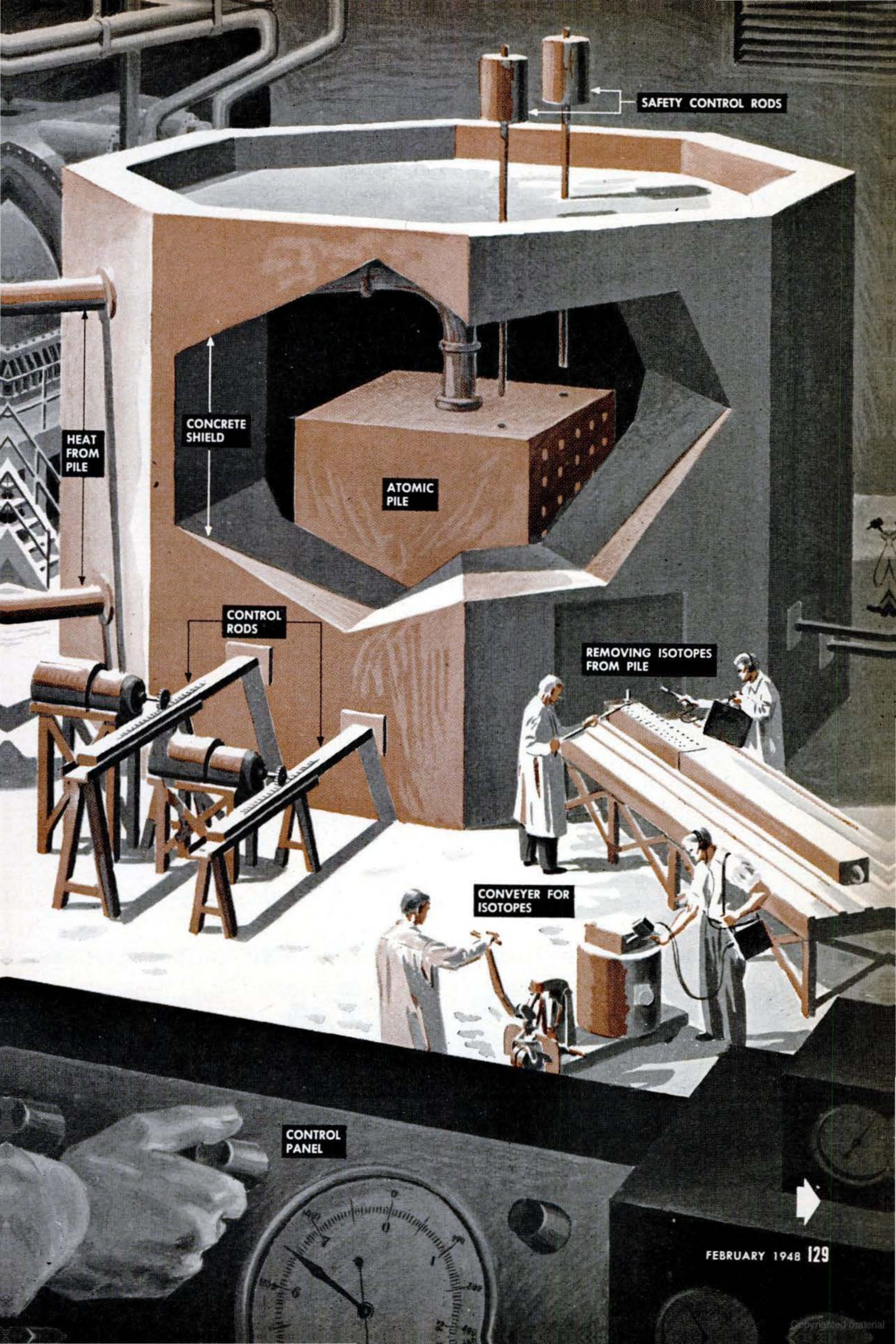
By Martin Mann

You—as a citizen—own a part of the 2½-billion-dollar atomic-energy industry. Although your individual share is only one in 143,000,000, it is probably the most important single thing you own. It provides the most powerful ***weapon in our arsenal for*** *war, promises* ***cures for*** *many diseases, and will eventually furnish cheaper electricity and transportation.*

YOU'VE heard a lot about atomic energy. But you probably have a lot of questions because so few people have actually seen an atomic engine. Well, I have. I was one of a small group of reporters who saw two nuclear piles early this winter. While they were operating, I touched them, stood on top of one, saw it turned on and off, watched as "hot" radioactive materials were taken out of it. So maybe I can help you visualize the process and get rid of some of the mystery.

Let's imagine you have just gotten a job running an "atom furnace." Sure I mean you! Some day such jobs will be as common as locomotive engineers. The engines of the future will be like the experimental piles I saw at the Argonne National Laboratory, which the University of Chicago runs for the U. S. Atomic Energy Commission.

Atomic power plant of future may look like this drawing. Some shielding omitted to show details.



Copyrighted material

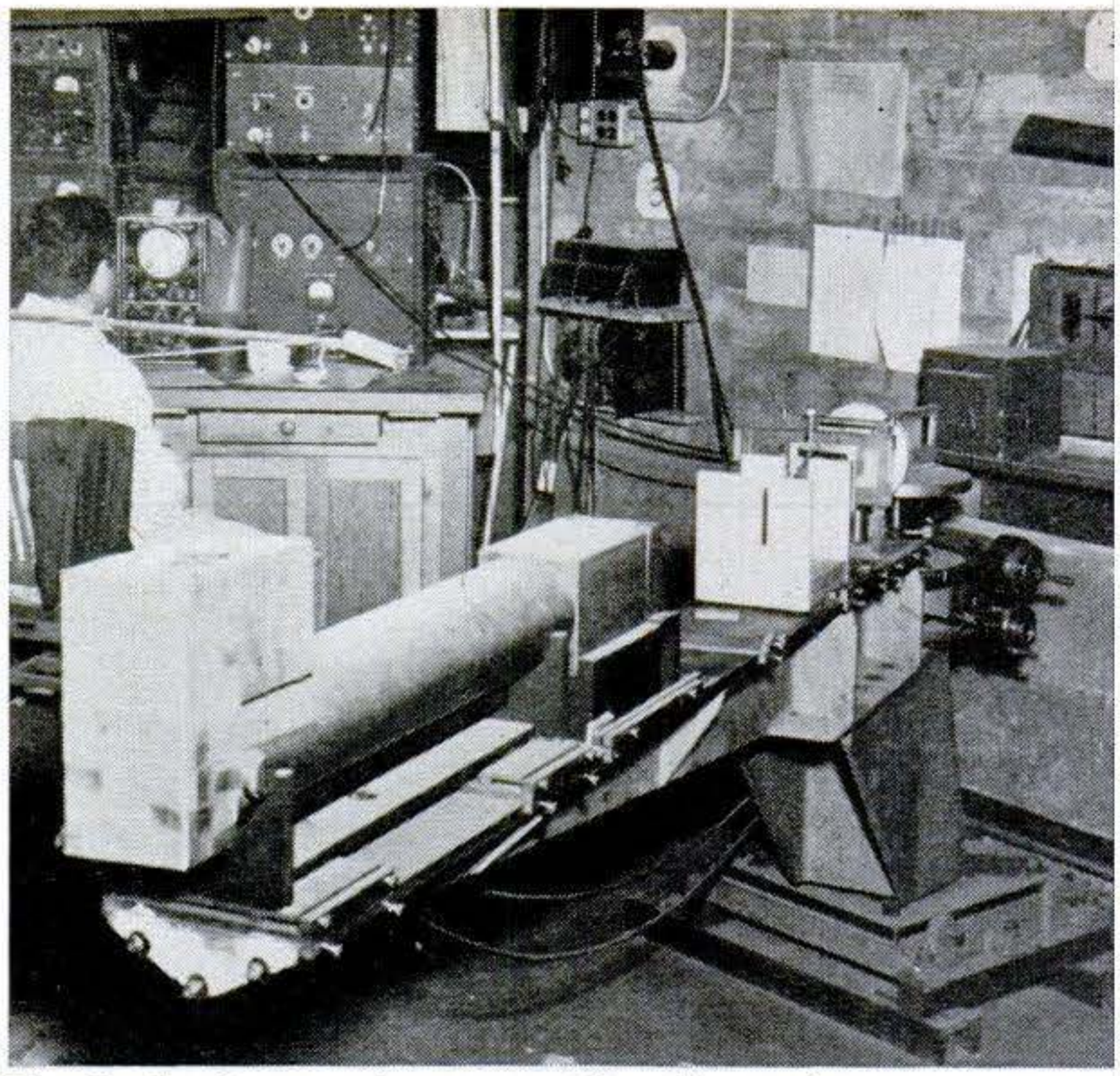
The laboratory is hidden in a forest preserve on the outskirts of Chicago. You go through the guarded gates, pick up your badge and protective radiation detector. Your place is at the back of the room at a panel crowded with meters and dials. When you arrive, you find the pile shut off. Bringing it up to power will be your first task. You do this by turning a little crank that sends electrical signals to special motors called Amplidynes.

The Amplidynes slowly pull cadmium control rods out of the pile. Atomic fission starts, and increases rapidly in intensity as the rods move farther out. Cadmium is a metal that soaks up neutrons. Since neutrons are the bullets that split uranium-235 atoms, pulling the rods out permits more bullets to fly around and more atoms split. Sliding the rods *in* cuts the bullet supply and reduces the fission. Sliding them all the way in stops it cold.

Watch the Birdie

You keep your eyes on the scale of the galvanometer (a sensitive ammeter) while adjusting these rods. A spot of light moves across the galvanometer's translucent scale, indicating the power level. It takes some careful back-and-forth cranking of the control handle to get the pile to exactly the power you want, but once you hit it, automatic control equipment takes over and keeps it there.

A number of detectors, sensitive to radiation, are built right into the pile. When they notice any change from the desired power level, they signal the Amplidynes to adjust the control rods. In an emergency the detectors signal other Amplidynes operating shut-off rods, which move into the pile with a resounding clump and stop it.



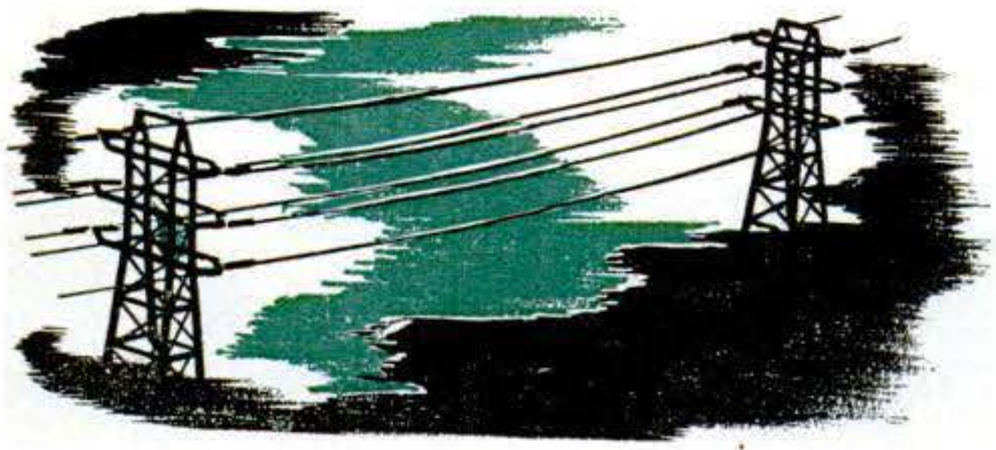
Typical of experiments with pile is this test of neutron-absorbing ability of various materials. Spectrometer (gunlike device) sorts the neutrons from the pile (rear) according to speed.

The automatic controllers leave the operator little to do except watch the dials and wait until the intercom squawks an order to change the power level. The pile is right behind him, but all he sees when he turns around is an eight-sided concrete block about as big as a small two-story house—with no windows or doors.

Even when the pile is yielding full power, 300 kilowatts, the only sound is a faint background hum—and that is only the fans in the building's heating system. Occasionally there is a whine as gears in the control boxes move to adjust the rods and keep the power level steady.

You can also see some piping right behind

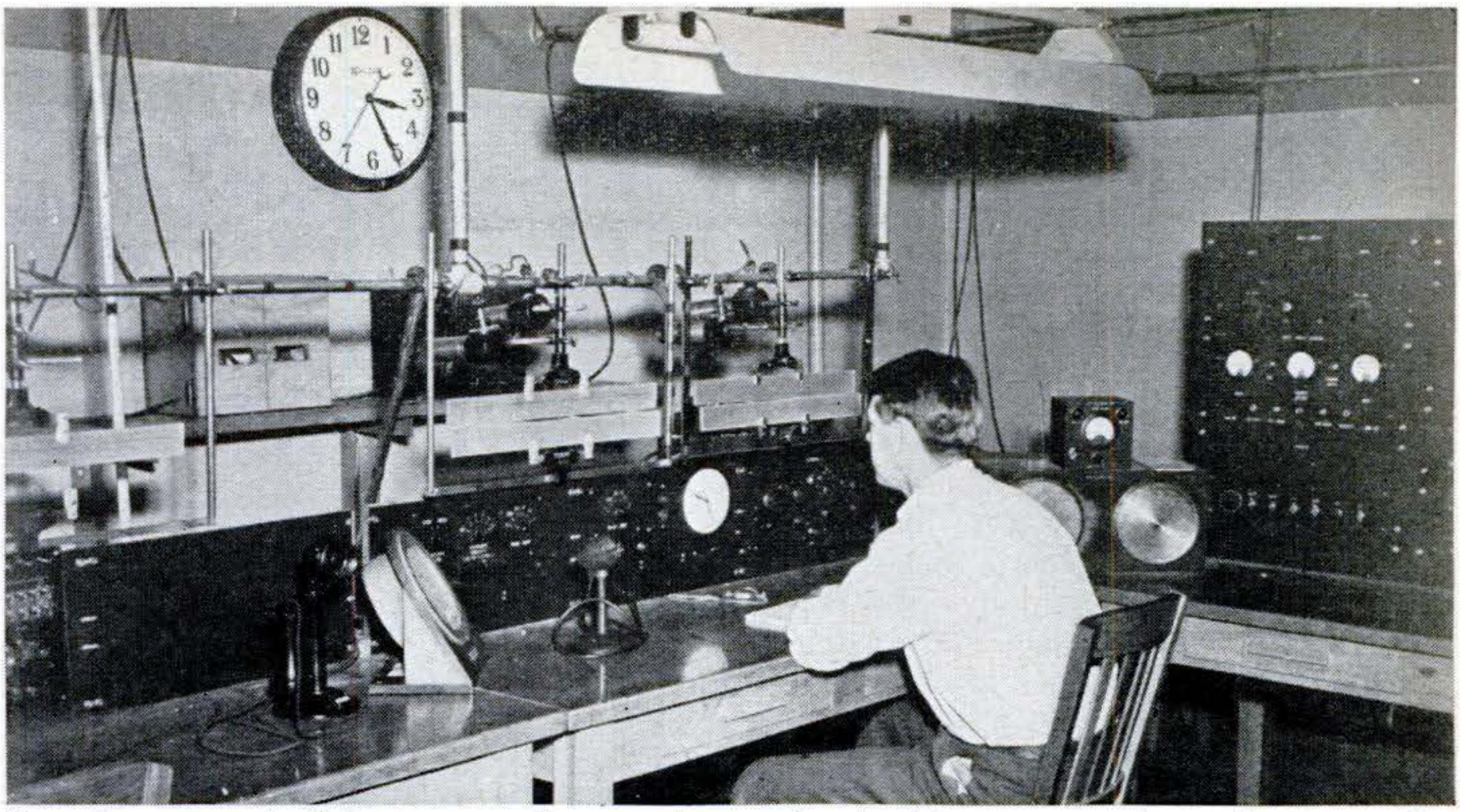
How Man Can Use the Atom



Cheaper electricity is the ultimate peacetime promise of nuclear energy. No power pile has yet been built, but most physicists think one could be made if proper construction materials are found. It may be many years, however, before atomic power is less expensive than coal.

Plutonium for a bomb so powerful that one can destroy a whole city is made in an atomic pile. Neutrons transmute the natural uranium-238 to the man-made element plutonium, which fissions as does uranium-235. Minute traces of natural plutonium have been found.

Copyrighted material



Complete control of the atomic pile is at the finger tips of this one operator. The output of power is indicated by spots of light on ruler-like scales in front of him. Wheels near his right shoulder operate electrical circuits that adjust cadmium rods to raise or lower power level. This is the control room for the 1 KW graphite pile at Argonne National Laboratory.

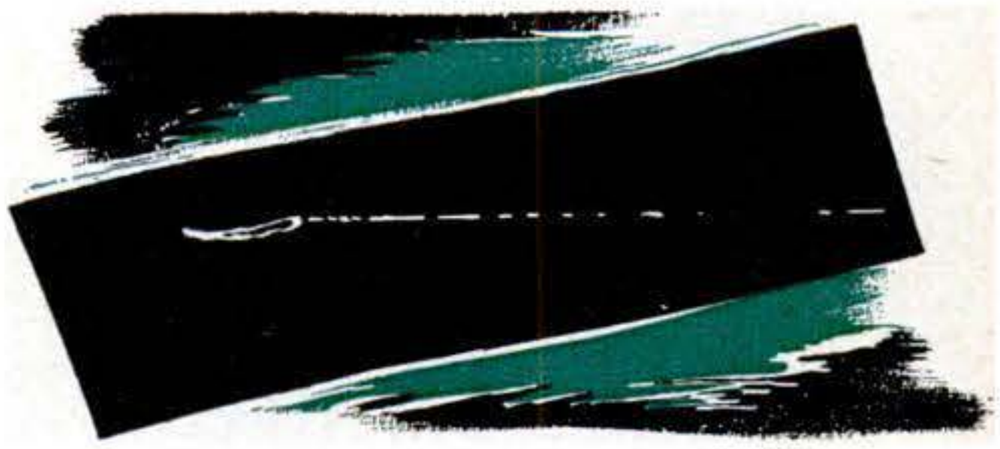
your operating position. These are the inlet and outlet pipes for the water-cooling system. The water, which keeps the pile from overheating, does not run into the pile itself (the neutrons would make it dangerously radioactive if it did), but flows through pipes behind a concrete shield, where it absorbs heat through a heat exchanger from another set of pipes containing heavy water, which looks and tastes like ordinary water, but contains a special kind of hydrogen twice as heavy as ordinary hydrogen. The heavy water does flow in and out of the pile (but not outside the shield), taking the heat out. The heavy water is radioactive, but does not affect the cooling water.

Some system of this kind will be needed to get the heat out of an atomic pile designed to furnish electric power, for *a power pile is simply a heat-making machine,* just as a coal furnace is.

Wanted: a Better Heat-Transfer Fluid

An efficient power pile must operate, however, at much higher temperatures than Argonne's low-temperature research pile. Heavy water, a very satisfactory heat-transfer fluid at low temperatures, will not work so well at high temperatures. Some other fluid, which can stand high temperatures and absorb few neutrons (so that it doesn't interfere with the chain reaction) will have to be

Medical research has benefited greatly from the radioactive isotopes manufactured in the atomic piles. These isotopes can be used in place of radium in treating diseases (they are cheaper and often better) and as tracers to tell where substances go inside the body.



As a research tool, the atomic pile is expected to add much to our store of knowledge. Drawing above shows what happens when a neutron hits a nitrogen nucleus in a cloud chamber—it knocks an alpha particle out (light line), and the rest of the nucleus recoils (heavy line).

Copyrighted material

used to transfer heat out of power piles, but what that material will be is still a question. That's one reason nobody has built a real power pile yet. A good heat-transfer fluid will probably be found among the metals that melt easily—bismuth might be a possibility.

Heavy water also has another job in this particular pile. It is the moderator that slows down the neutrons enough to keep the chain reaction going. It is one of the few materials that make good moderators.

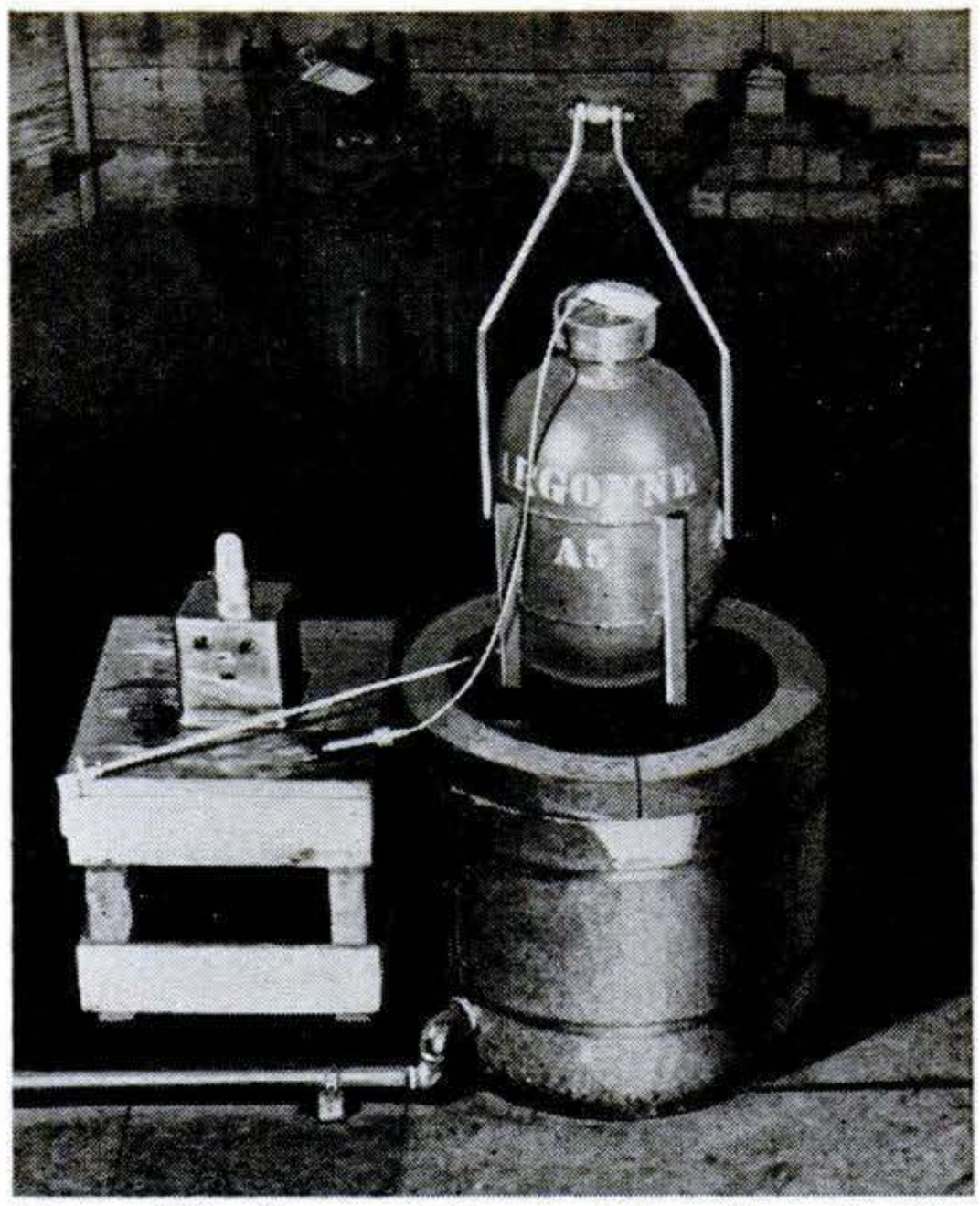
At Argonne, the space around the pile is cluttered with instruments, for this is a physics laboratory—it even smells like one. The pile is being used simply as a machine to produce neutrons, and the neutrons are being used in attempts to find out why atomic nuclei act the way they do.

Neutron beams for research come out of the pile through small holes in the thick concrete wall. When not in use, these are closed by cadmium plugs. Before a hole is opened, the area where the beam will shoot out is carefully roped off and the instrument setup checked by a "health-physics" inspector. He also tells the scientist conducting the experiment how long he may work there. For this beam can be as dangerous as X-rays: it can't be seen, or smelled, or heard, or felt and its deadly effects pile up over a period of time.

Life with an Atomic Pile

If you keep out of the way of the research beams, however, you are perfectly safe. No neutrons leak through the thick concrete walls of the pile. According to Dr. Walter H. Zinn, Argonne's director, you could set up housekeeping beside the pile and live there safely the rest of your life. A radiation counter held flat against the pile wall clicks slowly, registering only the cosmic rays that shower the earth everywhere. But when the counter is held in front of an open beam hole, the clicks speed up until the counter chokes, no longer able to keep track of the vast number of neutrons emerging. An atomic *power* pile, of course, would have no holes for research beams and would be still safer.

The only other place where radiation can get out of the pile to cause harm is at the "thimble," a hole surrounded by lead blocks on the roof of the pile. Through the thimble, materials can be inserted into the pile to be bombarded by neutrons and turned into the "tracers" that promise so much in medical research (see "Mail-Order Isotopes," PS Nov. '47, p. 87). The pile is shut off when the thimble is opened, so that few neutrons pop out, but many deadly gamma rays escape through the hole.



To get "hot" material out of the pile, scientists fish for it with grappling tongs, pull it up through the "thimble" (lower right) and into the "lead coffin" (bomb-shaped container).

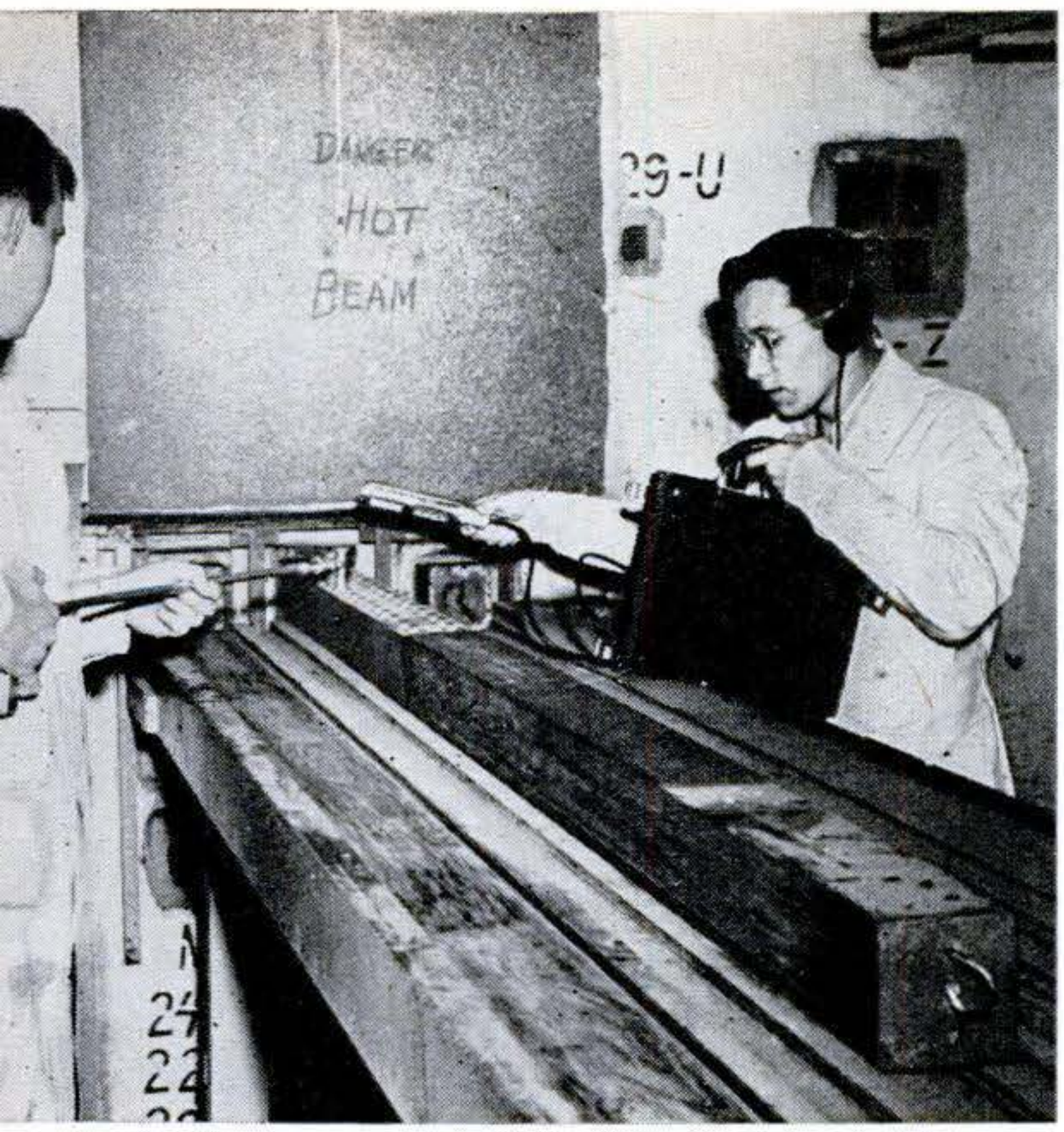
Even so, there is little danger, thanks to meticulous safety measures. The raw materials are placed in small aluminum cans and lowered into the pile with a long flexible shaft having claws on its end—a gadget much like a plumber's snake.

Snakes and Coffins

Getting the materials out of the pile after they have been made radioactive is more tricky, for each small can may give off as many killing gamma rays as 1/6 ounce of radium. A "lead coffin," a bomb-shaped lead container that can be opened top and bottom, is lowered over the thimble and opened. The snakelike tool then drops through the coffin and thimble into the pile, picks up the isotope can, and pulls it into the coffin. The bottom door of the coffin then is closed, the snake freed from the can, and the top coffin door closed. The "hot" isotope is thus surrounded by six inches of solid lead and can be carried safely anywhere.

Some opening like the thimble will probably be standard equipment even in a power pile. Most experts think that radioactive

Copyrighted material



Another way of getting things in or out of the pile is with this compartmented slide. The man at right is measuring radioactivity of newly made isotope, which is inside can held in tongs.

Materials that lose their radioactivity after a few seconds and so must be handled quickly are shot in and out of the pile through the "rabbit" pipe. Helium gas furnishes the push.

isotopes will be a profitable sideline for power companies. And besides, there will have to be some way to take out used-up uranium and put in fresh fuel. Uranium replacement is not a problem with this pile, since it operates at such low power that the original charge will last about 30 years. But a commercial atomic power plant will run at a much higher power level and need new fuel—though not nearly so often as a coal furnace does.

Pile No. 2 Is Right Across Hall

Argonne's second pile is set up in a similar room just across the hallway. Atop it is an enclosed room—another building within a building—in which experiments are conducted with the neutron beams coming up through holes in the floor. There are no holes for beams in the sides of this pile. Nor is there any special cooling system, since this pile operates at only one kilowatt and doesn't make much heat. Instead of heavy water, the moderator that slows down neutrons is graphite (the "lead" of lead pencils), and this will probably be used in atomic power piles, too. Recently, however, a controllable pile using plutonium and fast neutrons has eliminated the moderator, so it may not be needed in power piles.

Some of the metal parts used around the Argonne piles—such as the long-handled tongs that hold materials in the neutron beams—are made of aluminum, because aluminum absorbs few neutrons. But aluminum would not be much good in a power pile, because it would melt at the high operating temperature. This is another of the tough problems facing the designers of atomic power plants. Steel can stand very high temperatures, but absorbs so many neutrons that the chain reaction would stop, or at least become very inefficient. One metal that meets both temperature and neutron-absorption requirements is beryllium. Unfortunately, it's rather scarce and hard to work.

Research aimed at filling these gaps in engineering knowledge has already started at several of the Atomic Energy Commission's laboratories.

How long will it take? Some scientists estimate only two years will be needed to make the first electricity from atomic energy —experimentally. Uranium may not compete on a dollar-and-cents basis with coal, however, until much later. Where cost is not the most important factor, you may see atomic power fairly soon. Uranium-fueled battleships and submarines, able to cruise for years without refueling, may be afloat within five years. END

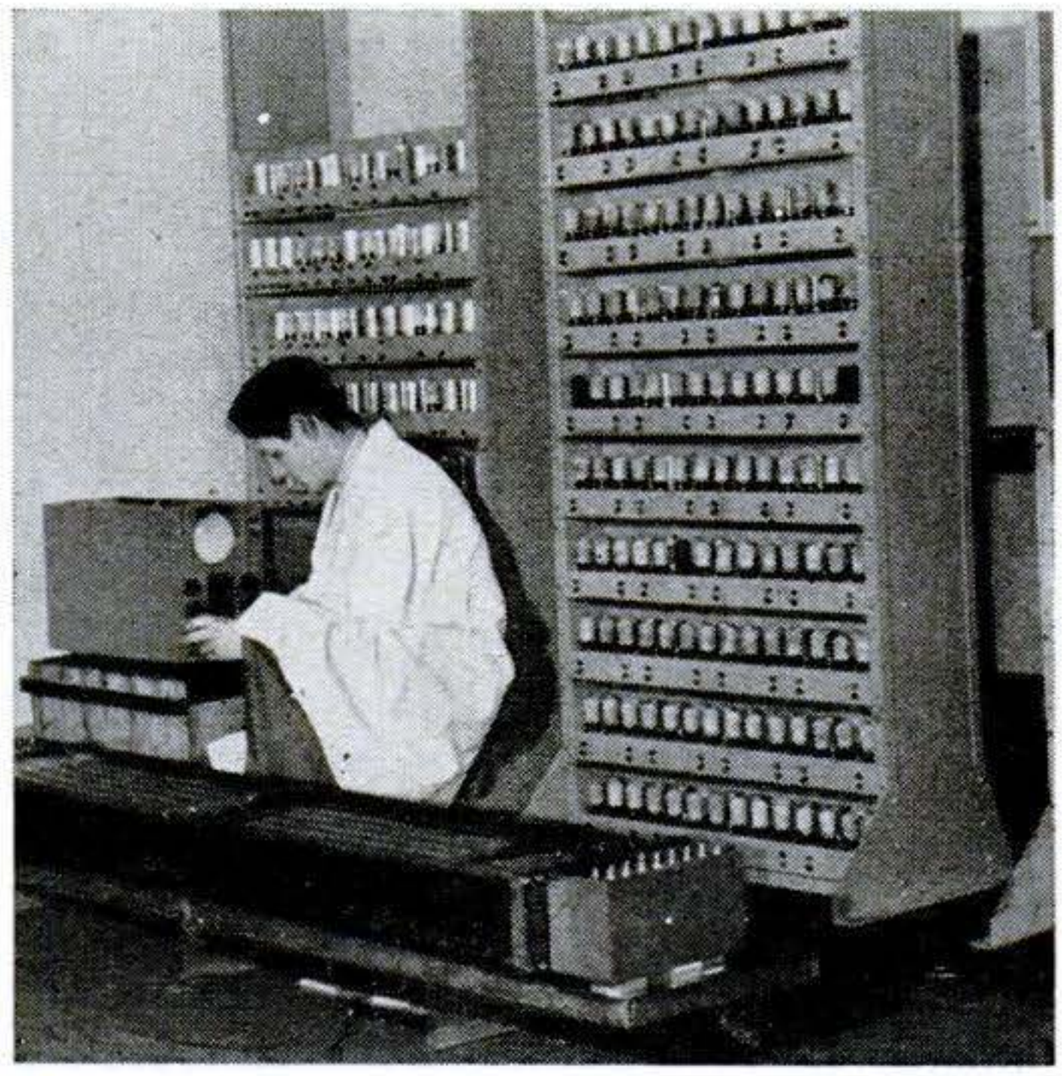
Copyrighted material

Uphill Pull Made Easy

ADAPTED from the ski tow, this overhead trolley system gives tired coal miners an "assist" up a steep hillside from the mine entrance. A worker simply grabs a rod traveling at 180 feet a minute, and hangs on until he reaches the top. The system was installed by the Link-Belt Co. at a Jones and Laughlin mine in Washington County, Pa.

Gates Grasp Boxcargo

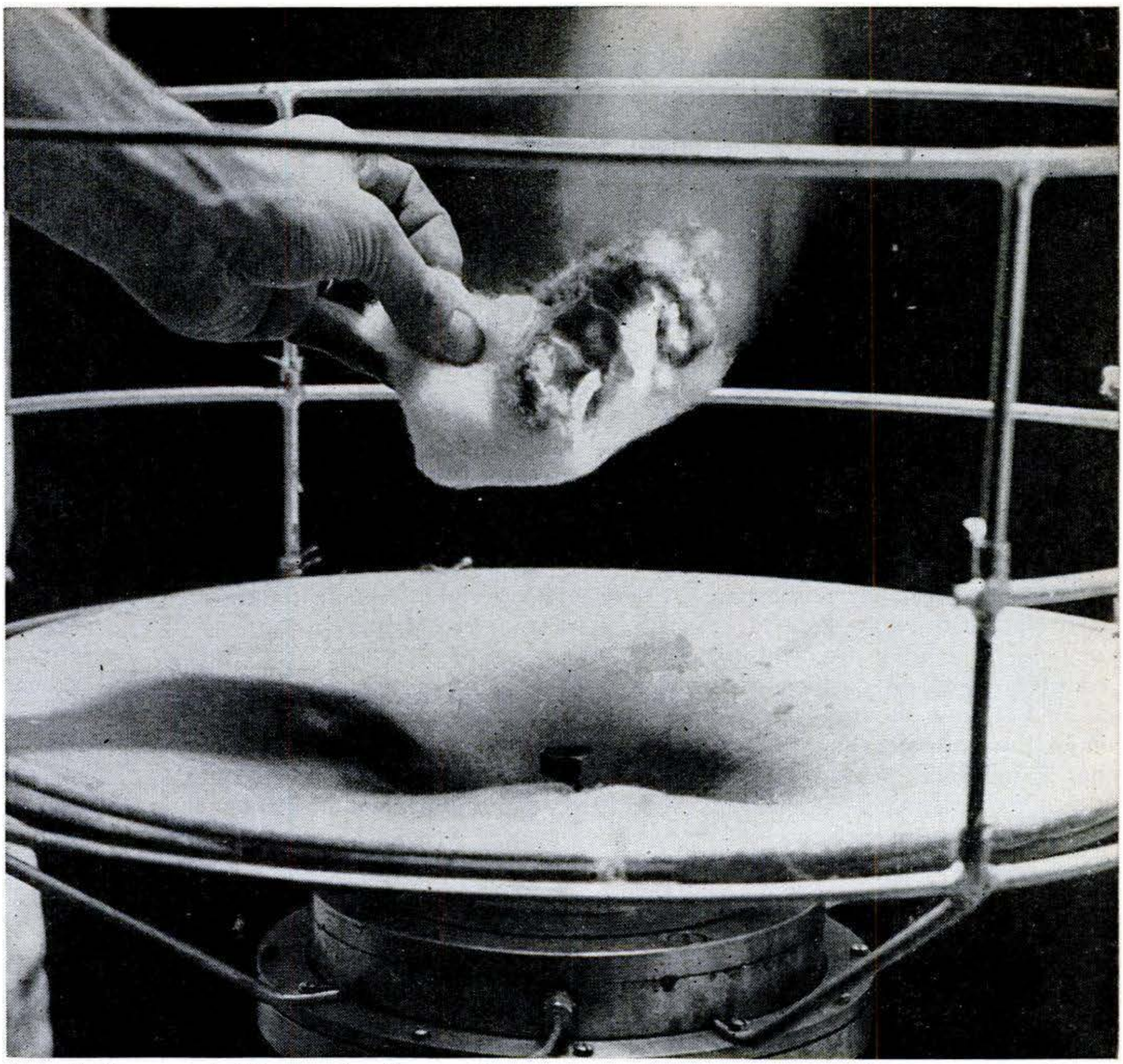
THE latest Pennsy boxcars, 10 to 20 feet longer than standard, not only carry extra big loads but deliver them in better condition. To prevent shifting, the steel gates shown above are locked across each section after it's loaded. Hinged shelves drop to form an upper floor that keeps the top half of the load from damaging the lower part.



New Calculating Wizard

EDSAC, a British cousin of our electronic mathematical brains, such as ENIAC and EDVAC (PS, May '47, p. 95), will handle 10,000 multiplications a minute. Now under construction at England's Cambridge University, EDSAC will remember details of calculations and use "judgment" in choosing the best way to reach a result.

Copyrighted material



A wad of cotton held over the throat of a supersound generator quickly bursts into flame.

Silent Sounds Are Hot

A Pied Piper is coming to your house whose lethal tunes are too high-pitched for you to hear.

PS photos by W. W. Morris

SOUNDS, so high-pitched that you cannot hear them, sterilize food, mix paints, kill germs, clear away fog and smoke, and wash clothes. In the not-too-distant future such sounds may also keep your home free of insects, mice, and rats. To fill a room with such inaudible, useful noise, you may simply plug a "silent sound generator," no larger than a small table radio, into an ordinary electrical outlet.

The relatively new field of research that promises you such conveniences is called "ultrasonics." Scientists specializing in it are finding countless uses for their silent "supersounds." It would be difficult to name an industry in which some application of supersounds cannot be employed. Ultrasonic experts hesitate to draw any limiting borders around the field that they are exploring.

Every sound is a vibration or wave. Sound waves in the air are like the ripples that

Copyrighted material

form on a pond of water when you drop in a pebble, and the pitch of any sound depends on how many waves are formed per second. The fewer the waves, the lower the frequency and pitch; the greater the number of waves, or cycles, every second, the higher the pitch. Hit the lowest key on your piano's keyboard and the sound you hear is produced by 27 waves a second. Touch the last key at the high end and you set up 3,500 waves a second.

No Limit to Number of Sounds

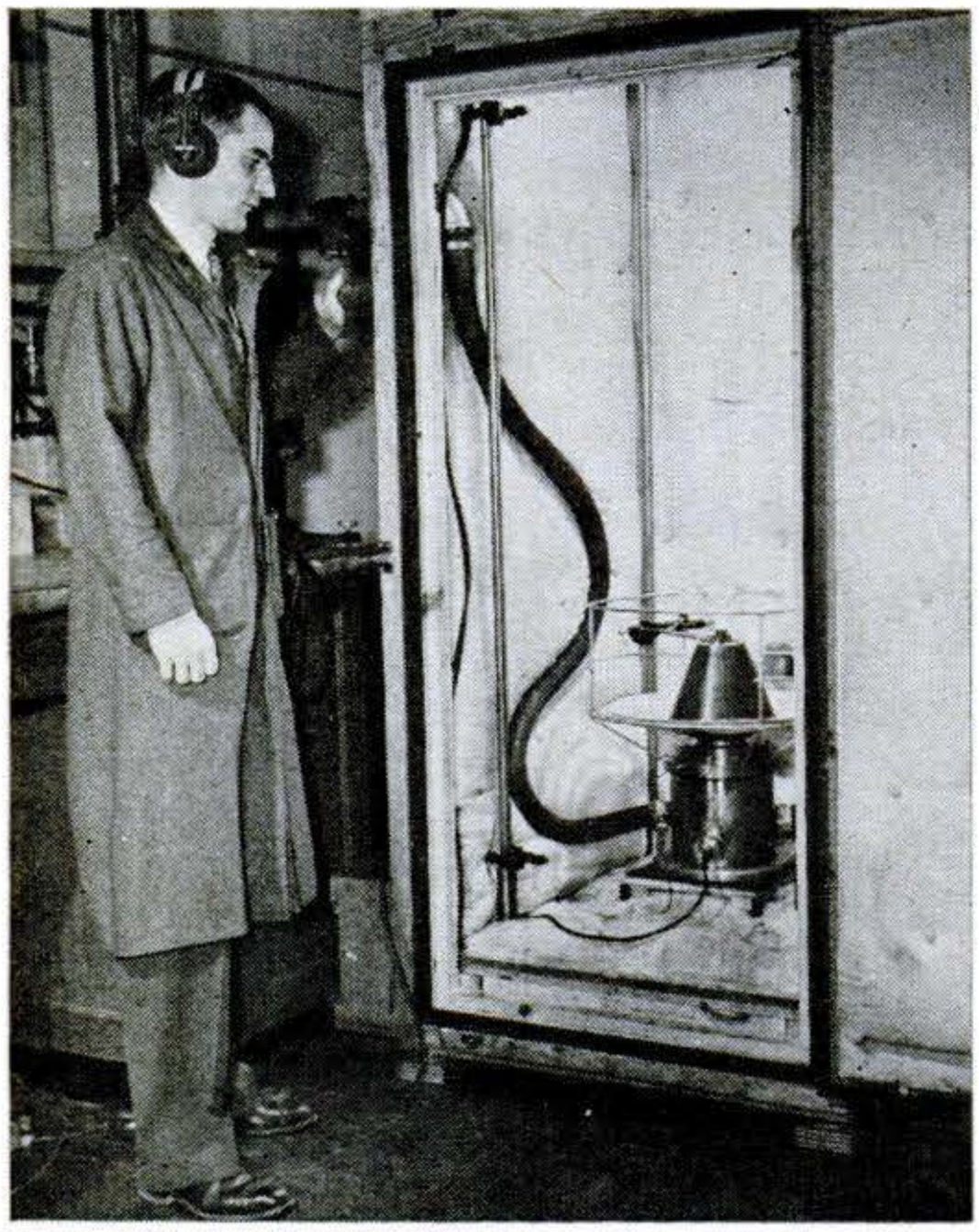
Theoretically, there is an unlimited scale of sounds. They range from the extremely low-pitched sounds that might be produced by a fraction of a wave a second to extremely high-pitched sounds developed by an infinite number of waves a second. The human ear, however, is sensitive to only a small part of this sound spectrum. The lowest note on a large organ—about 16 waves a second—is about as low as our ears can hear. Eighteen thousand waves a second is about the normal ear's upper limit. Above that is the realm of ultrasonics.

Supersounds in that fascinating realm can be produced either electrically or mechanically. In an electrical system, high-frequency alternating current is passed through a small quartz crystal. This causes the crystal to expand and contract rapidly to set up the ultrasonic waves. The action is similar to that of a crystal-type loudspeaker. This type of generator can produce supersounds with frequencies as high as 12,000,000 cycles a second. But the effective range of these sounds is so short that the vibrations must be transmitted either directly, by actual contact with the material to be treated, or indirectly, through the almost incompressible medium of a liquid.

A mechanical supersound generator cannot produce such terrifically high frequencies, but can beam its vibrations through the air so effectively that its ultrasonic effects can be felt at some distance.

Typical of the mechanical silent-sound producers is a "supersiren" now being used experimentally in the Acoustics Laboratory of Pennsylvania State College at State College, Pa. It was perfected by C. H. Allen and Dr. Isadore Rudnick in cooperation with Dr. H. K. Schilling, the laboratory's director. This supersiren is capable of producing inaudible sounds with frequencies as high as 34,000 cycles a second—about twice the pitch that can be heard by the human ear.

Compressed air forced into the siren's main chamber tries to escape through 100

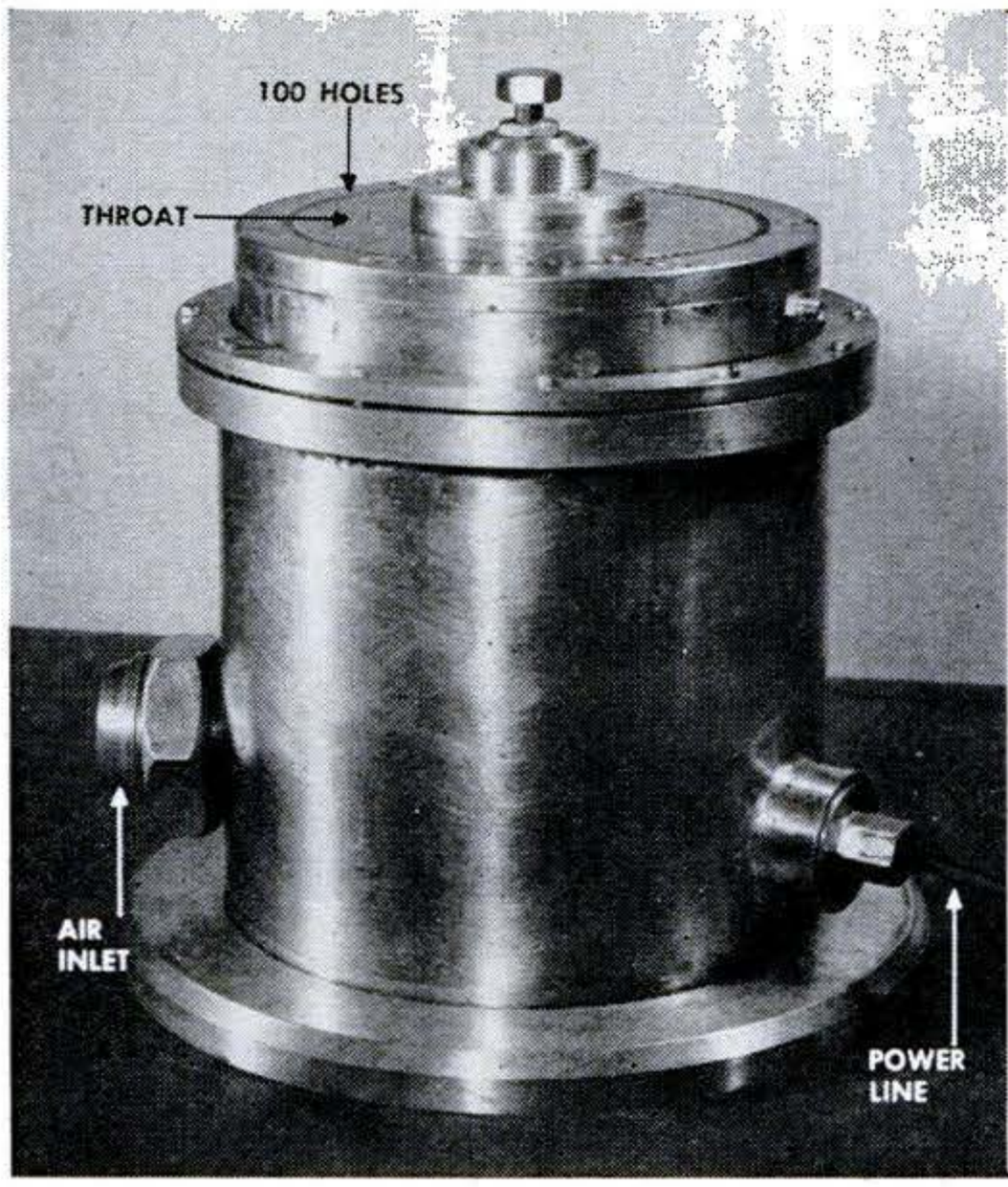


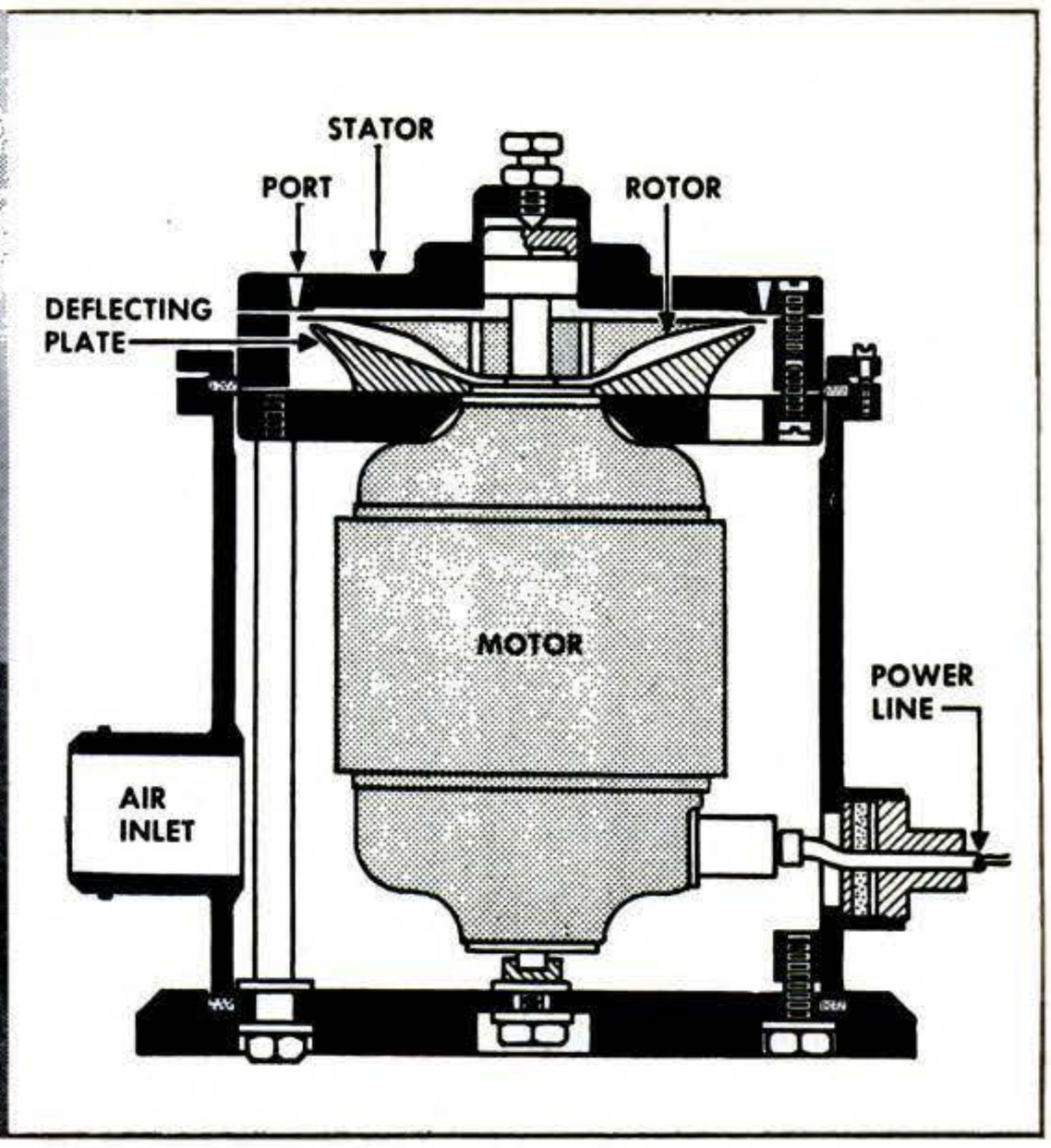
Supersiren in use at Penn State College. The technician, with his hand on a compressed air valve, wears special ear plugs for protection when the siren is operated in the audible range.

Here the ingredients are prepared to brew coffee with silent sound. The waves coming from siren's throat, vibrating 18,500 times a second, will quickly boil the water.

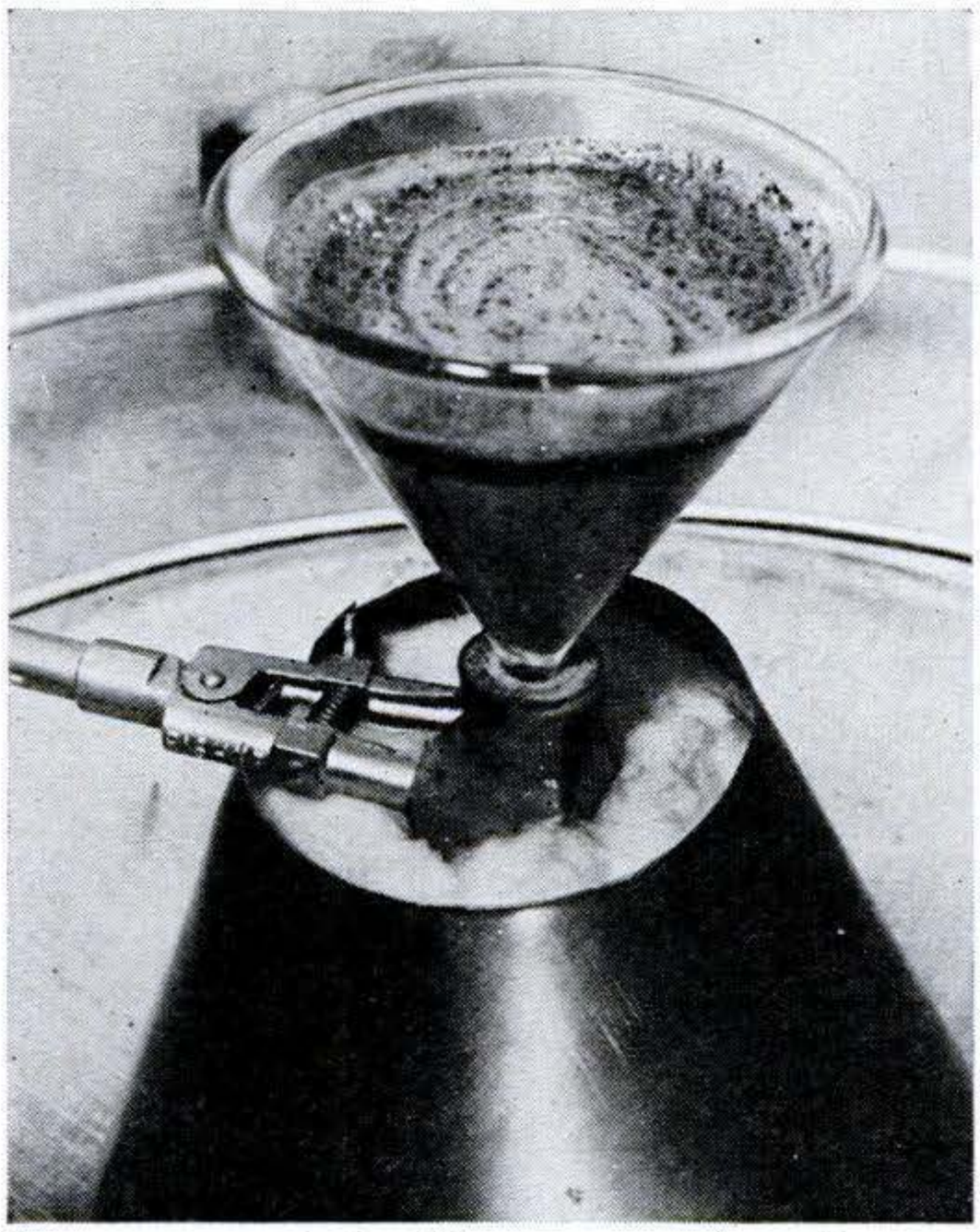
Copyrighted material

small, conically shaped holes spaced evenly around the siren's head. But before the air can escape, a whirling, sawlike rotor with 100 U-shaped teeth chops it into tiny puffs or pulses. Each puff becomes a sound wave, and what comes from the siren's throat is sound. Since the rotor, or air chopper, is rotated by a variable-speed electric motor, the experimenters, simply by varying the speed of the rotor, can run the gamut of

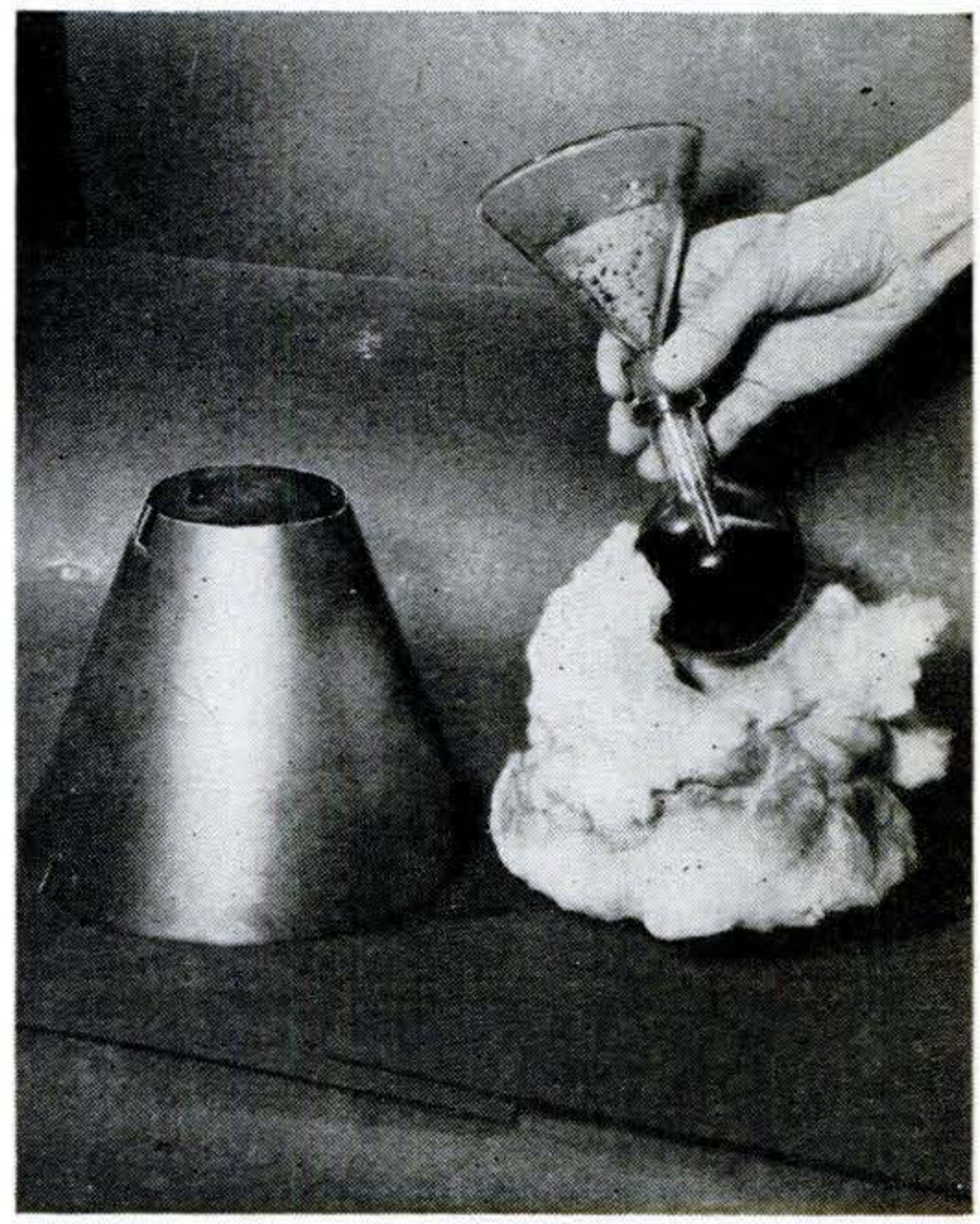




Simple in operation, the supersiren shown above is just a glorified high-speed meat grinder in which a stream of air replaces the meat. It chops air into rapid-fire puffs to produce high-frequency sounds the same way that a bicycle or fire-engine siren produces audible howls.

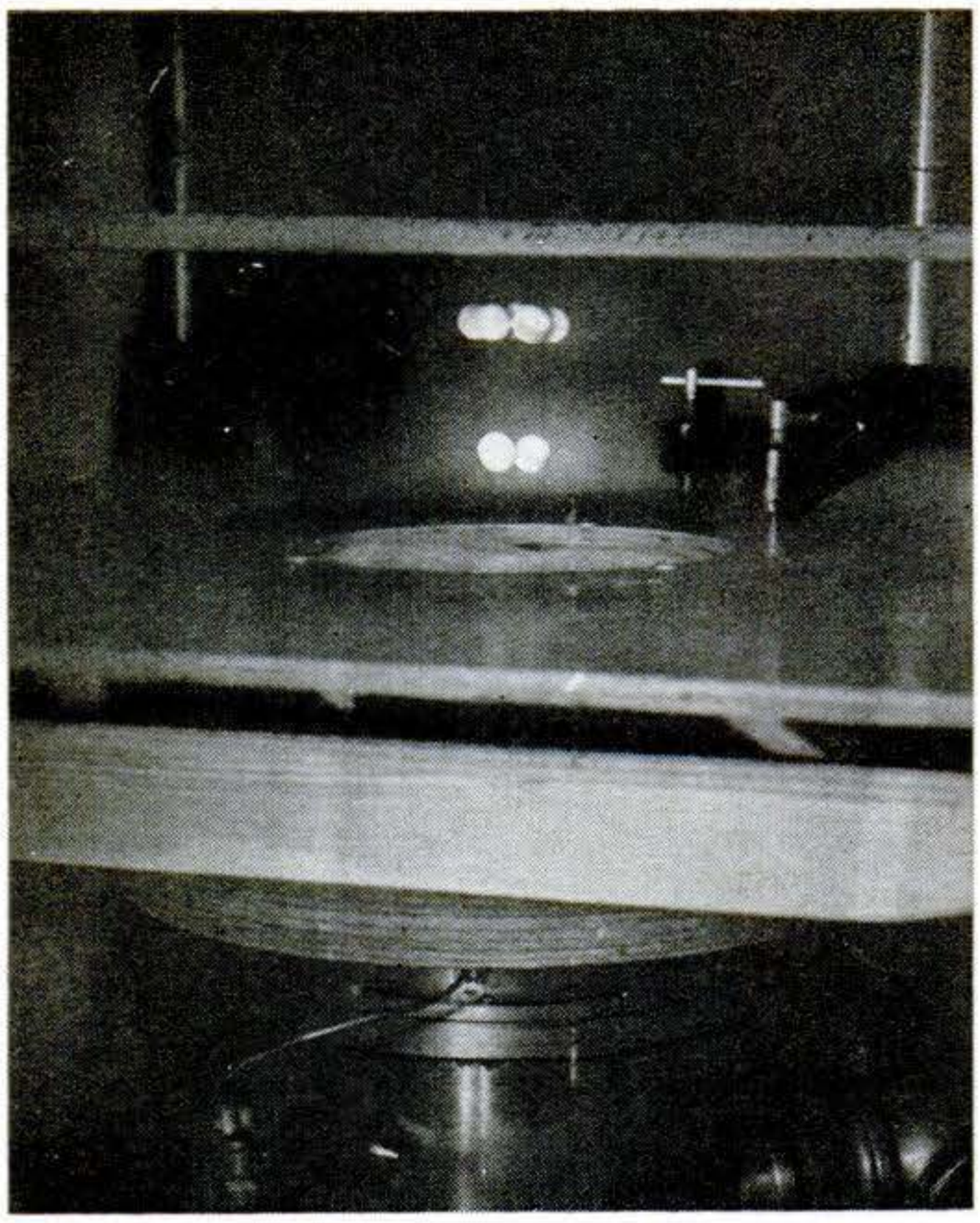


Lower part of the laboratory-made coffee pot is placed inside the throat of the supersiren, with the funnel that holds the coffee sticking out. Water will boil in less than six minutes.

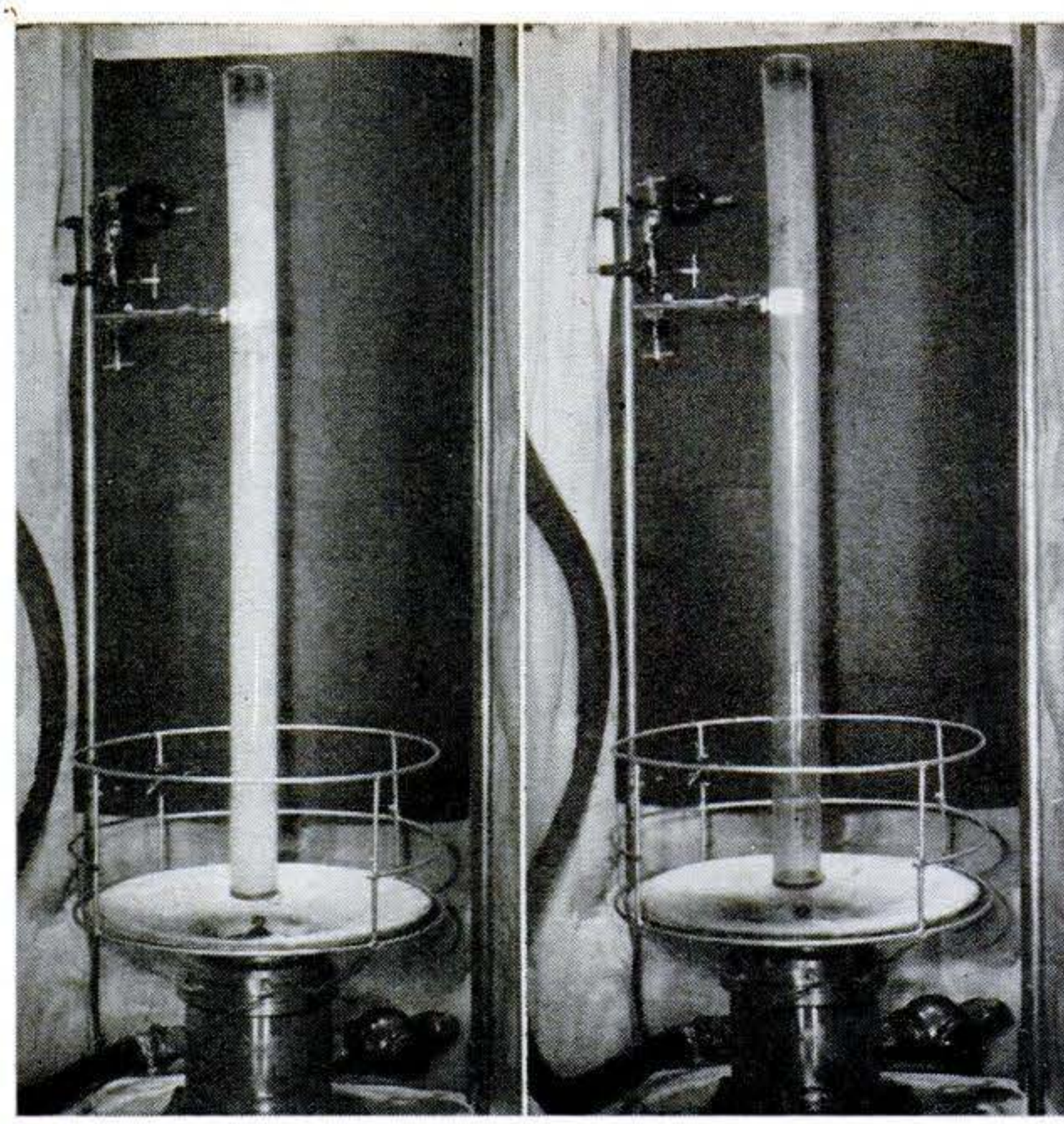


Here bottom flask part is wrapped in a wad of glass wool preparatory to coffee-making demonstration. The glass wool absorbs the sound energy, becomes hot, and in turn heats the water.

Copyrighted material



Marbles are floating on sound in this demonstration of the siren's power in the audible range (about 3,000 cycles a second). For protection, operators must wear ear plugs and rubber muffs.



This experiment shows how supersound can dispel fog. At left is tube of water vapor before the siren was turned on. At right is the same tube 3½ seconds after the siren was turned on.

sound through the audible range to the inaudible. At 1,800 r.p.m. the siren produces an audible sound of such intensity that the average observer with ears unprotected is stunned—and sometimes nauseated.

When the rotor speed is boosted to 11,000 r.p.m., sound is still there but its frequency is above the ear's ability to hear. Finally, as the rotor reaches its top speed of 20,000 r.p.m., it silently screeches a supersound produced by more than 30,000 waves a second.

Sound Waves Can Burn and Boil

The sounds that this supersiren produces can be used to do an amazing number of things. Hold a piece of cotton over the throat and it bursts into flames in a few seconds. Put water over it and it boils in a matter of five or six minutes. Its sound waves will even pop corn.

Sound is energy, and the energy coming from the siren's throat is equivalent to about two kilowatts—enough energy in the electrical sense to light 50 ordinary 40-watt household electric lamps! That energy can be put to use in many ways.

The waves can kill germs, bacteria, insects, and rodents literally by cooking them with the sound energy that their bodies absorb. If just the right frequency, or range of frequencies, is used, sound can scare away birds, insects, and other pests. It can precipitate soot and dirt from the air to help keep our cities clean. Directed at clothes, it can shake the dirt loose more effectively and in less time than any conventional washing machine or vacuum cleaner!

At least a dozen large dairies are using the vibrations of sound waves to homogenize milk. Similarly, manufacturers are testing the abilities of sound to mix paints, blend face creams and salad dressings, and produce permanently "shaken-up" medicines.

In California, at the Navy's landing-aids testing station near Arcata, a giant sound horn is being perfected to jar fog particles into rain drops as a means of dispersing fog over airports.

Supersounds also are giving manufacturers and maintenance men a quick and sure way of checking metal parts. Supersounds vibrating millions of times a second and aimed at a part being tested bounce back when they hit a flaw and indicate the imperfection to the machine's operator.

Medical researchers and manufacturers all hope that the silent sound experts with their supersirens will be able to help them solve some of their unsolved problems. END

Copyrighted material

CONVENTIONAL TRUCK

AIR-COOLED DISK ATTACHED TO EACH WHEEL

BRAKE-ACTUATING CYLINDERS

FINS COOL BRAKE DISK

ASBESTOS SHOES, OPERATED BY BRAKE CYLINDER, "SQUEEZE" DISK TO SLOW WHEEL

Trains Get a Brake

NEW disk brakes stop a train so silently and smoothly that the passengers scarcely feel it when the engineer jams them on in an emergency. Developed by the Budd Co., of Philadelphia, they will halt a 100-m.p.h. train in less than 2,500 feet without a jolt—or damage to brake or wheels. That's 1,000 feet less than is required by the best conventional clasp-type brakes.

Main problem in designing the new brake was to get rid of the immense heat generated when the shoe gripped the disk. By using two small, lightweight shoes insulated with asbestos the heat is forced into the cast-iron disk. This has multiple cooling fins to throw off the heat as it revolves.

The new brake is said to last 10 times as long as one with cast-iron shoes, and to double the life of the wheel. There is a minimum of parts, and the simplified design permits the shoes to be changed quickly. Brake linings last up to 105,000 miles.

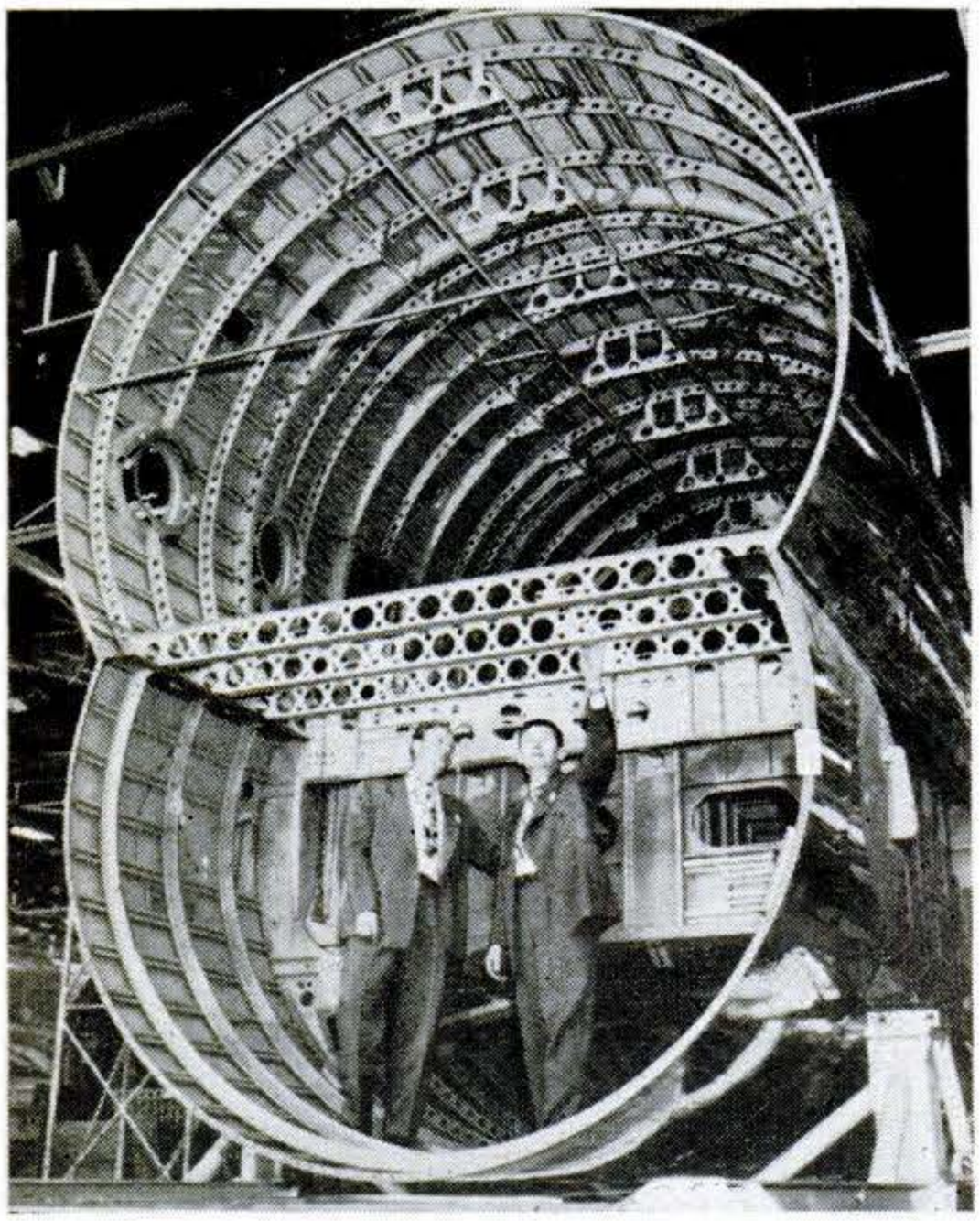
Junior Station Wagon

THIS all-steel, four-passenger Crosley station wagon is small but roomy—and it sells for less than $1,000 at the Marion, Ind., factory. With the rear seat removed, there is a 26-cubic-foot space for baggage. A commercial version of the station wagon, a lightweight panel delivery truck, has a quarter-ton carrying capacity.

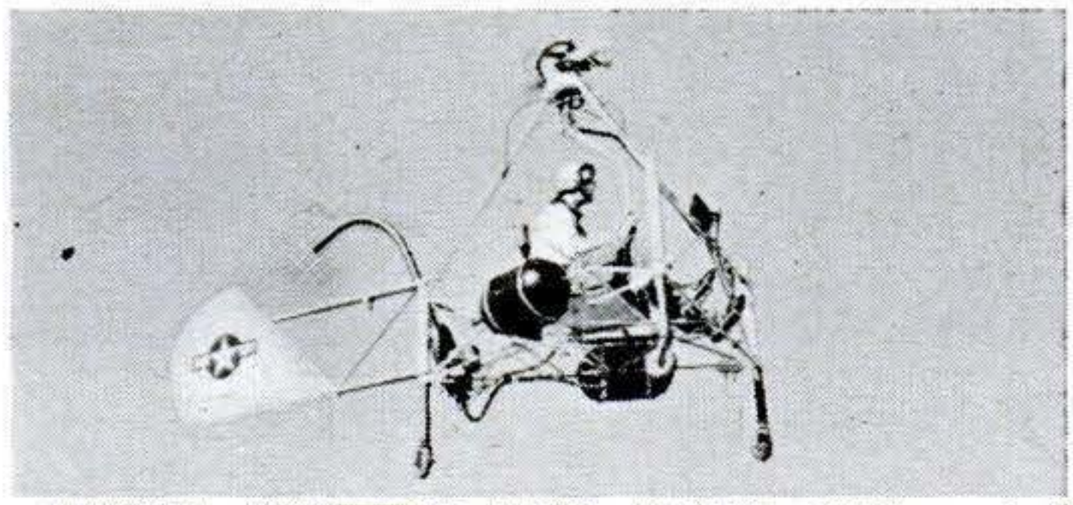
Copyrighted material

What's New in Aviation

Testing Built-In Jato. With three of its 18 auxiliary rocket motors going off in a cloud of smoke, Boeing's XB-47 nears the end of its preflight tests. The six-jet bomber (PS, Dec. '47, p. 94) is the first plane to have jet-assisted-take-off units built into the fuselage. They provide a total of 18,000 pounds of thrust.

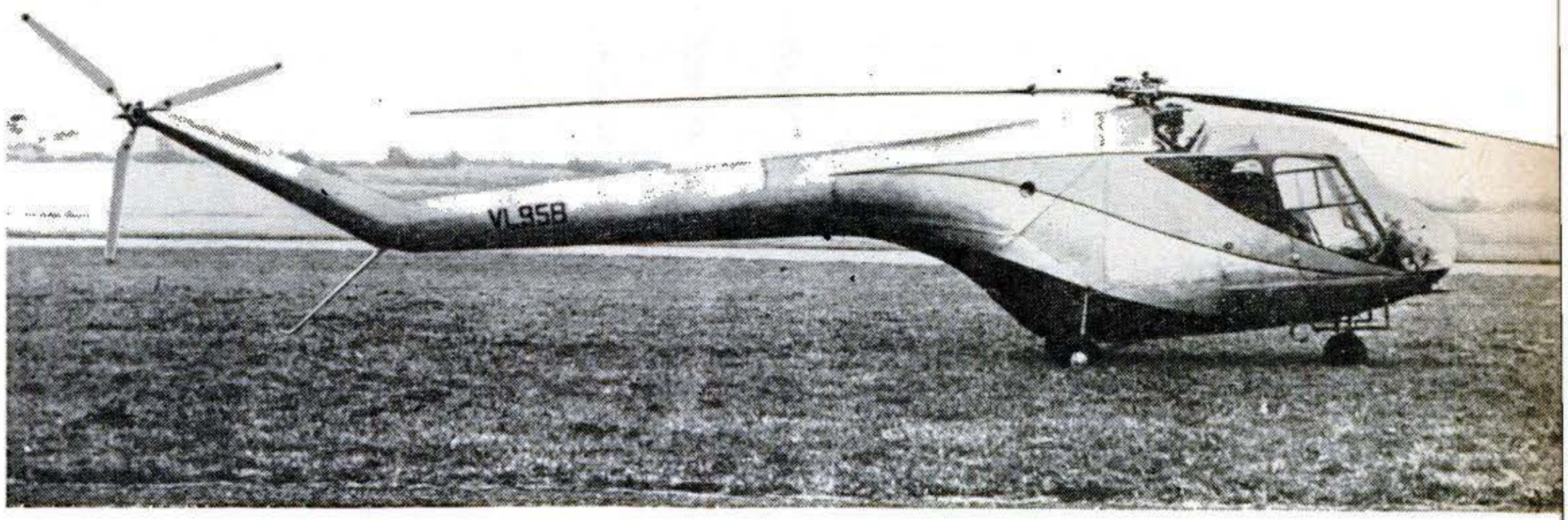


Double-Decker in the Making. The two-story fuselage of a Stratocruiser while still under construction serves as a classroom for air-line men. They take a three-week course to get acquainted with the 67½-ton plane before it starts passenger service.



Ramjets Hoist "Little Henry." Two small ramjet units, one at the tip of each rotor blade, power this McDonnell helicopter, first of its kind. In flight (top), the Air Force's "flying motorcycle" does 50 m.p.h., carries 300 pounds.

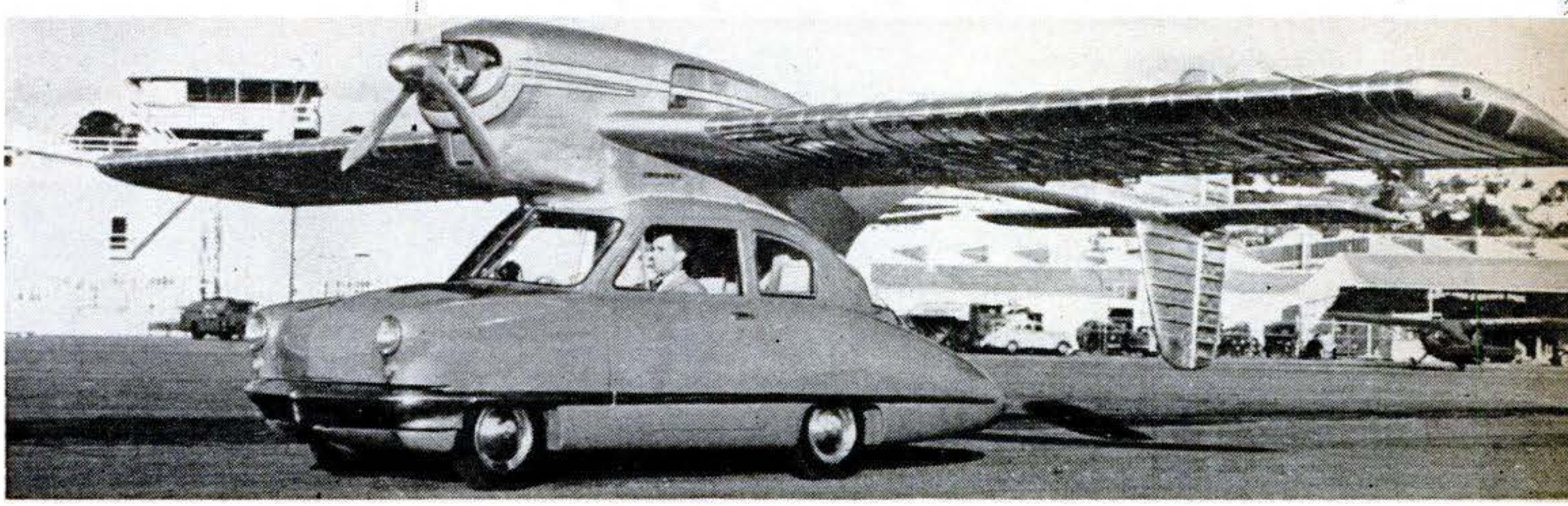
Copyrighted material



British Newcomer. The elongated Bristol 171 is Britain's first commercial helicopter. A four-seater, it is designed to do a variety of jobs, including air-taxi work. Its low-slung rotor blades fold back along the fuselage for parking in tight spots.

Finger-Tip Flying. Nearest thing to no-hands piloting is this tiny control unit that makes a plane respond to finger-tip pressure. It is part of a lightweight, all-electric automatic pilot developed for the Navy by General Electric.

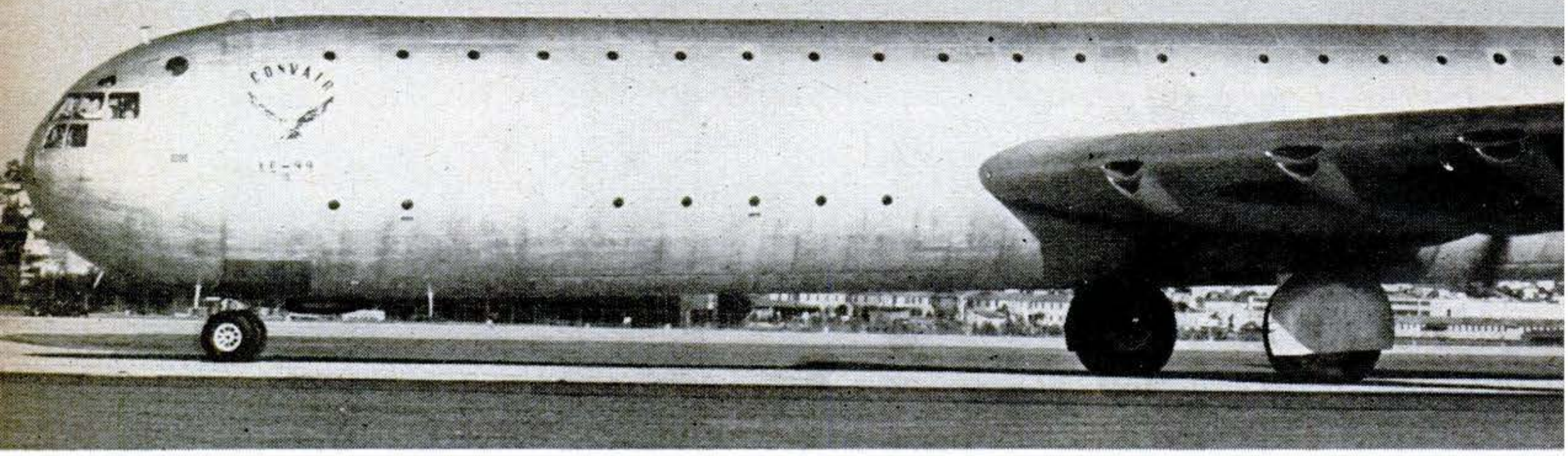
XL-15 Folds Up for a Tow. With wings and tail surfaces removed and then latched to the sides of its fuselage, the Army's versatile XL-15 liaison plane turns into this neat package that can be towed up to 40 m.p.h., easily hidden or stored.



Auto Plus Wing. Mounting a wing and a 190-hp. engine on top of a four-place car, Consolidated Vultee engineers turned out this experimental flying auto. With the wing detached, the 900-pound glass-fiber car has its own 26½-hp. engine for highway travel. The machine cracked up during tests, but work on it is continuing.

Copyrighted material

Flying Freight Train



Nine-foot-high main wheels, inherited from B-36, give the XC-99 a slightly nose-heavy look,

Equal to 10 boxcars, the Air Force's XC-99 is world's biggest land plane.

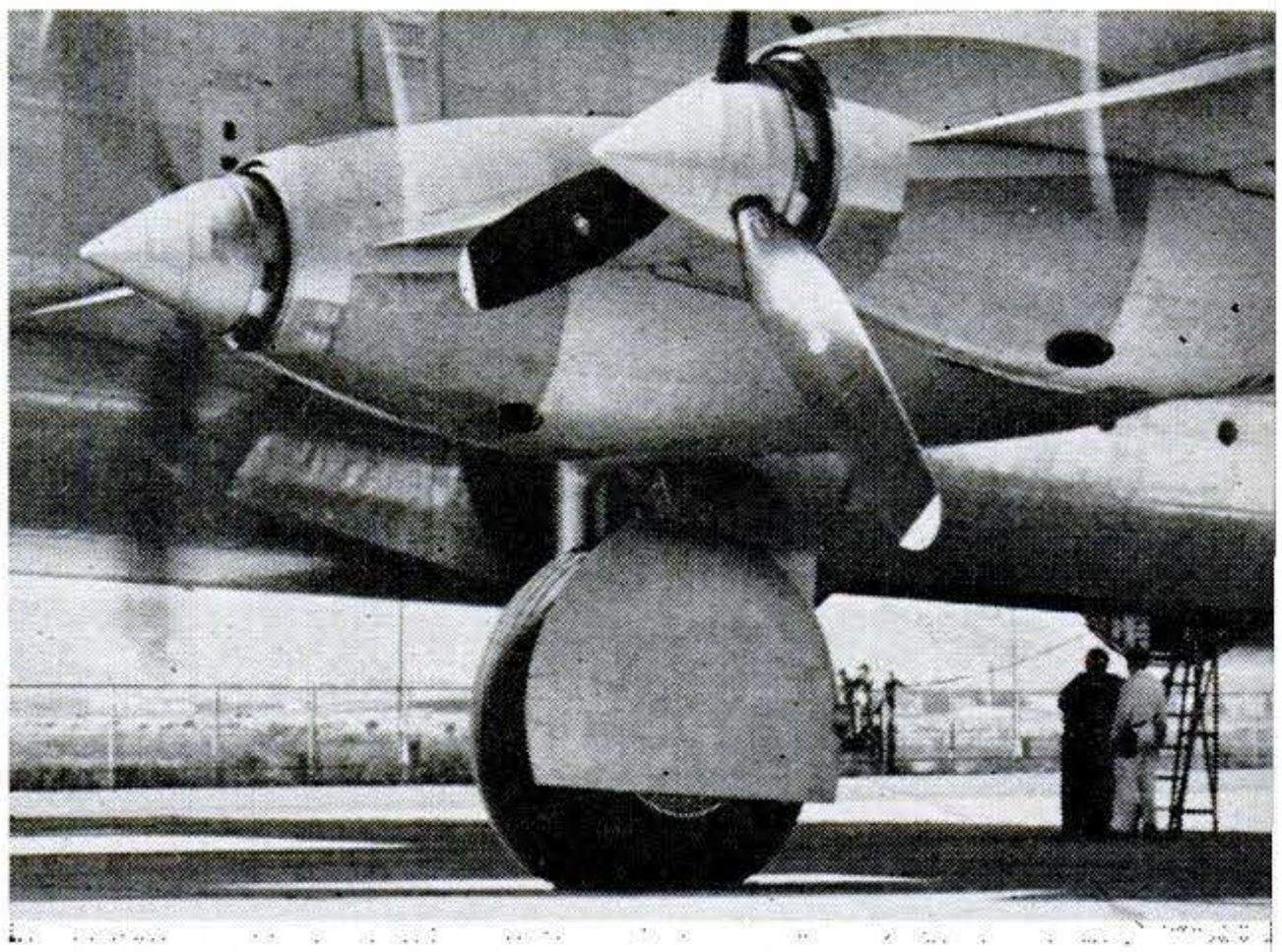
DESIGNED to carry 400 troops or 100,000 pounds of cargo at speeds up to 300 m.p.h., the XC-99 is the U.S. Air Force's newest heavyweight—the biggest chunk of flying machinery ever to take off from a runway.

The huge cargo carrier was developed by Consolidated Vultee from the B-36, which it resembles, but it outdoes its bomb-toting predecessor by 20 feet in length, 10 feet in height, and a lot of space inside. The two cargo decks of the XC-99 have a total volume of 30,000 cubic feet, equal to 10 railroad freight cars.

The fuselage is 182½ feet long, the tail assembly 57½ feet high. The 230-foot wing, seven feet thick at one point, has 18 fuel compartments that hold 21,116 gallons of gas. That supply would last an average motorist about 20 years; feeding the six pusher engines of the XC-99, it gives the plane a maximum range of a little more than 8,000 miles.

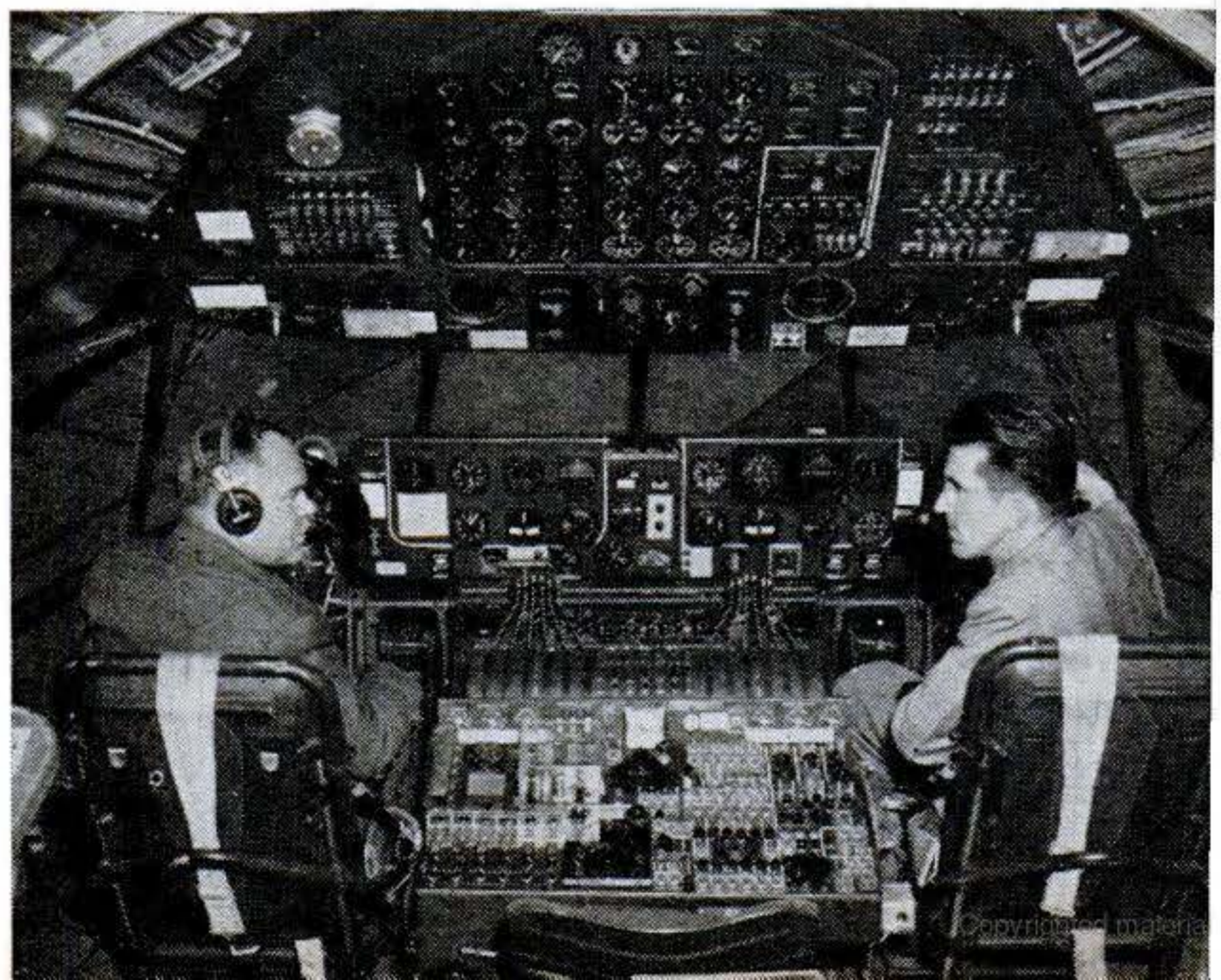
The engines are so-called "power eggs"—complete interchangeable units—turning out 3,000 horsepower each. In early flight tests, they got the 265,000-pound plane off the ground in about 4,000 feet.

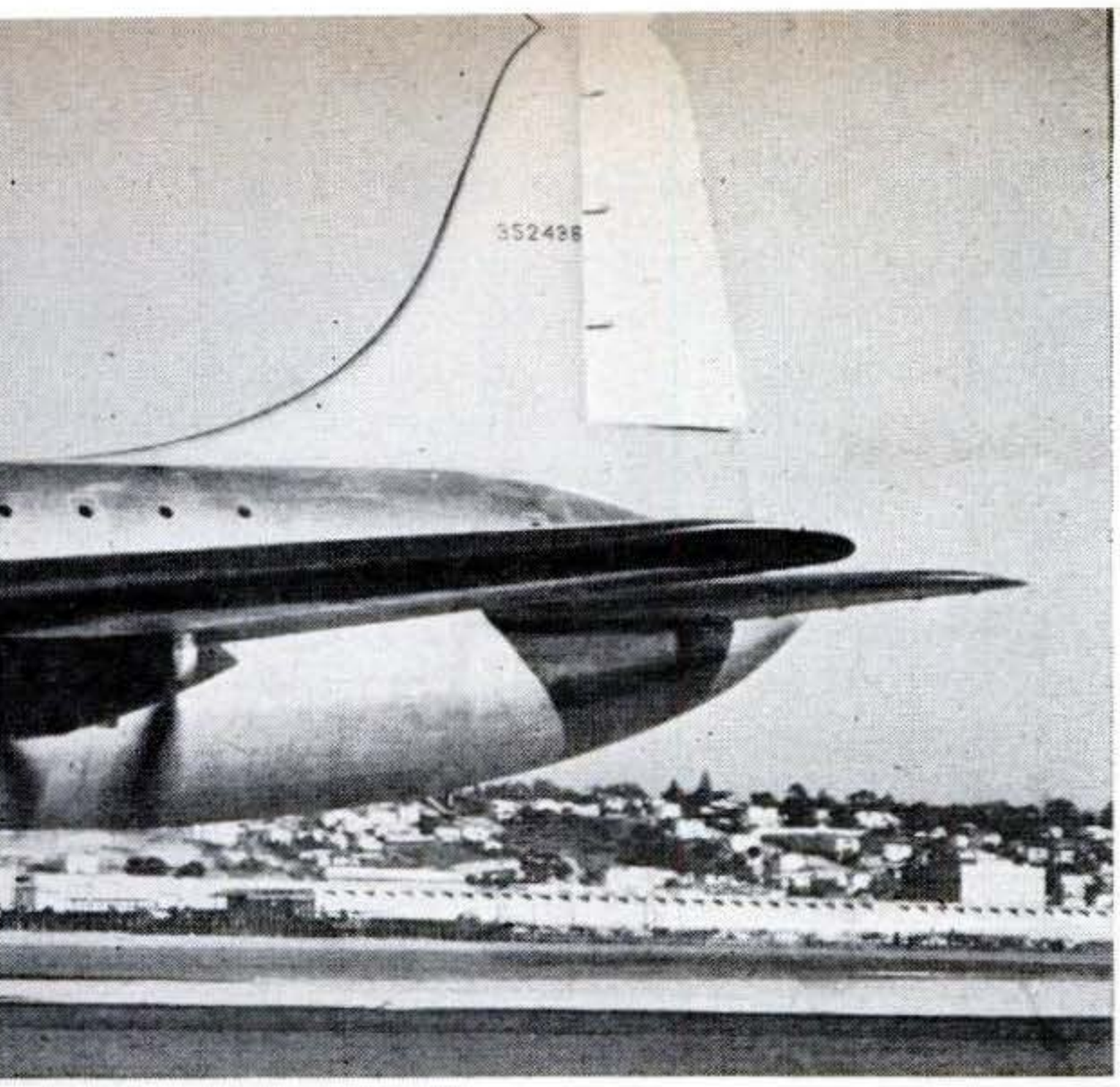
In spite of the XC-99's bulk, its pilot has no hydraulic control system to help him fly it. Instead, he moves spring tabs in the mammoth control surfaces (almost as big as the entire wing of a B-24), and air pressing against the tabs moves the control surfaces.



Nineteen-foot propellers have reversible pitch and built-in, thermal anti-icing system. Each of the six 28-cylinder engines has two turbo-superchargers for flights up to 30,000 feet.

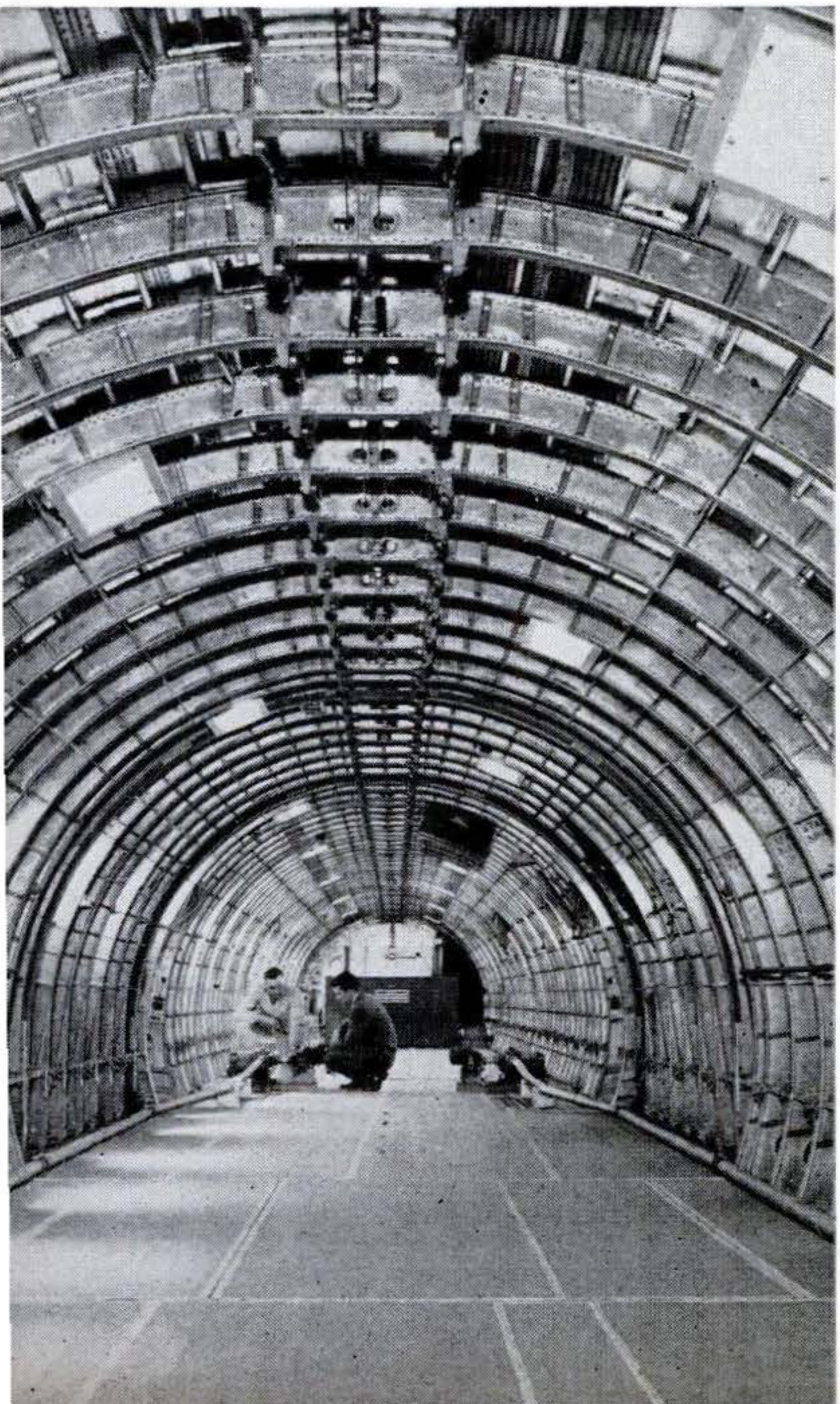
Mass of instruments is compactly arranged in flight compartment. To avoid duplication of controls and aid communication, flight engineer sits between and slightly behind pilots.

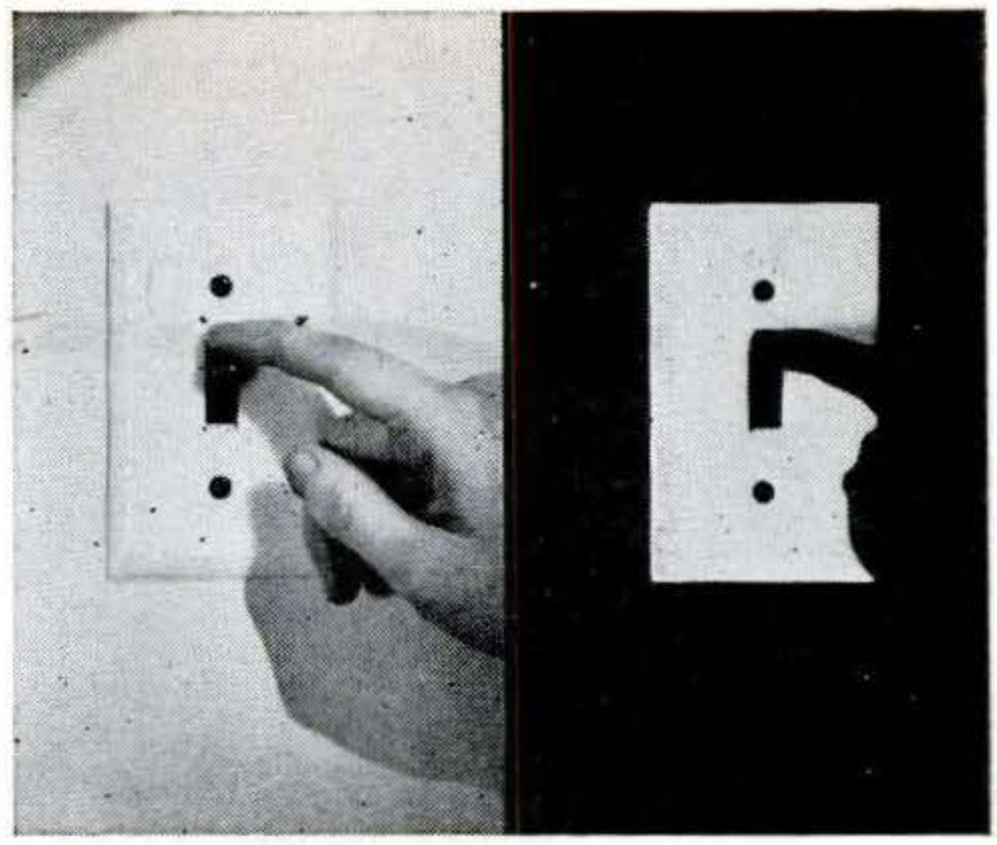




which is enhanced by the five-story tail fin.

Looking aft along the tunnel-like upper cargo deck gives an idea of its capacity; it is 130 feet long, 7½ feet high. Lower deck has electrically operated sliding doors for dropping cargo in flight. Eighty-six windows provide light, and 12 exits are available for escape in case of forced landing or ditching.

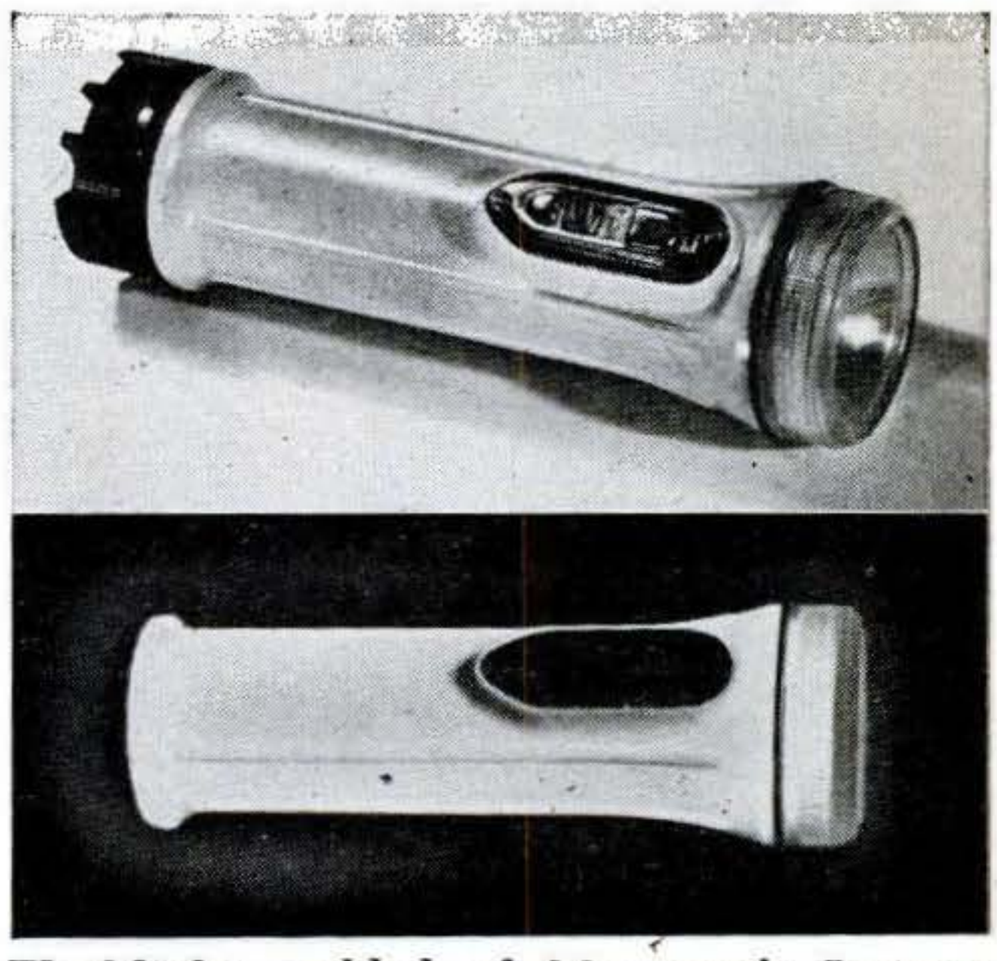




Light-switch panel of du Pont's phosphorescent Lucite was photographed in the light (left), then in darkness (right). New Lucite has all the wear-resistant qualities of the old.

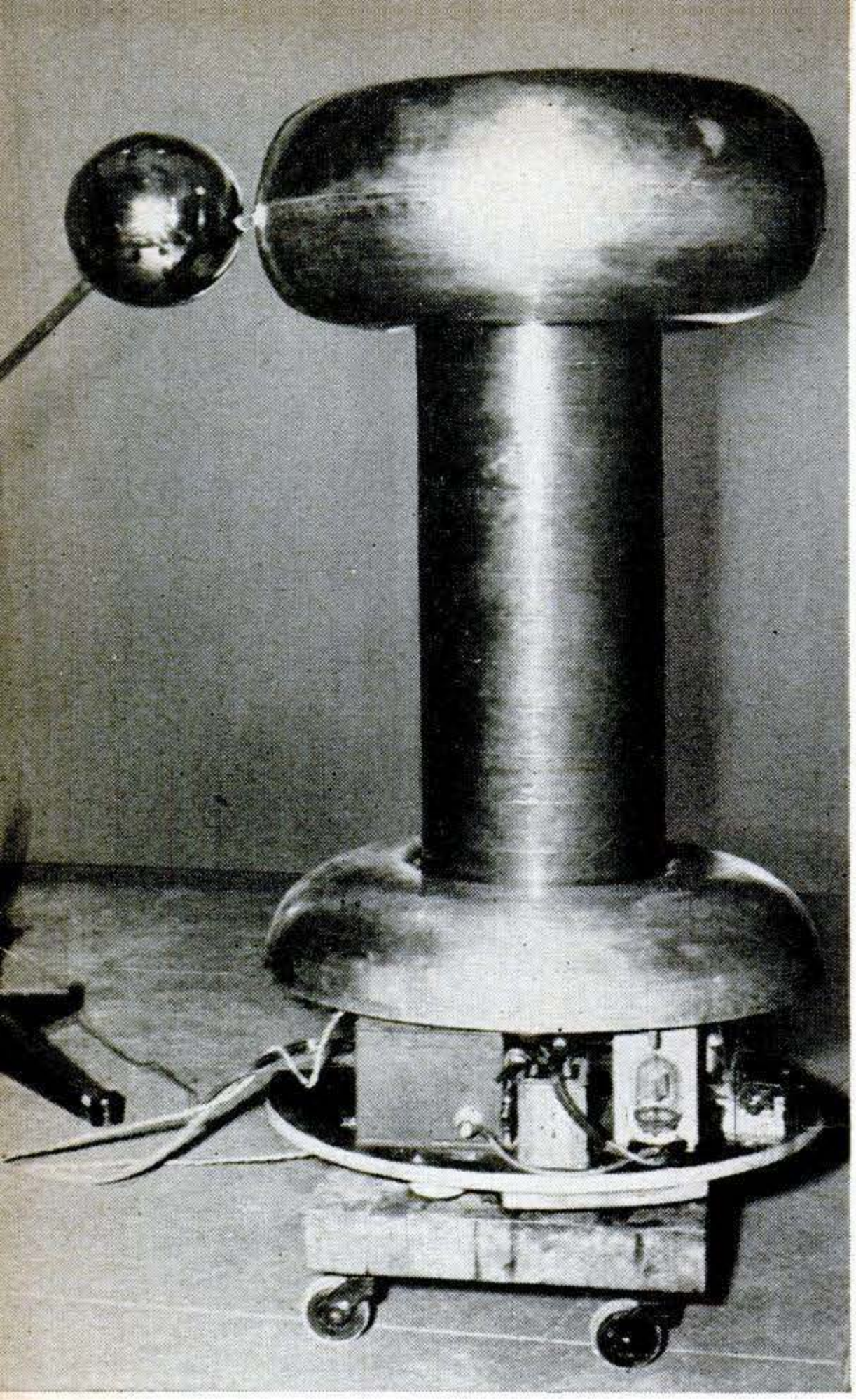
Putting a Glow Into Plastics

PHOSPHORESCENT plastics that glow for as long as 12 hours after exposure to light are now available for commercial uses. Promising new tricks galore for the ever-growing field of plastic products, the glow is achieved by adding special pigments to existing plastic compounds, which are otherwise unchanged. Possible applications include indoor and outdoor signs, light switches, ornaments, instrument panels—anything a manufacturer wants to make visible in the dark without bothering about a continuous power supply.



Flashlight molded of Monsanto's Lustron gives light even when it isn't switched on. Maximum brilliance is attained immediately after exposure; glow persists long afterward.

Copyrighted material



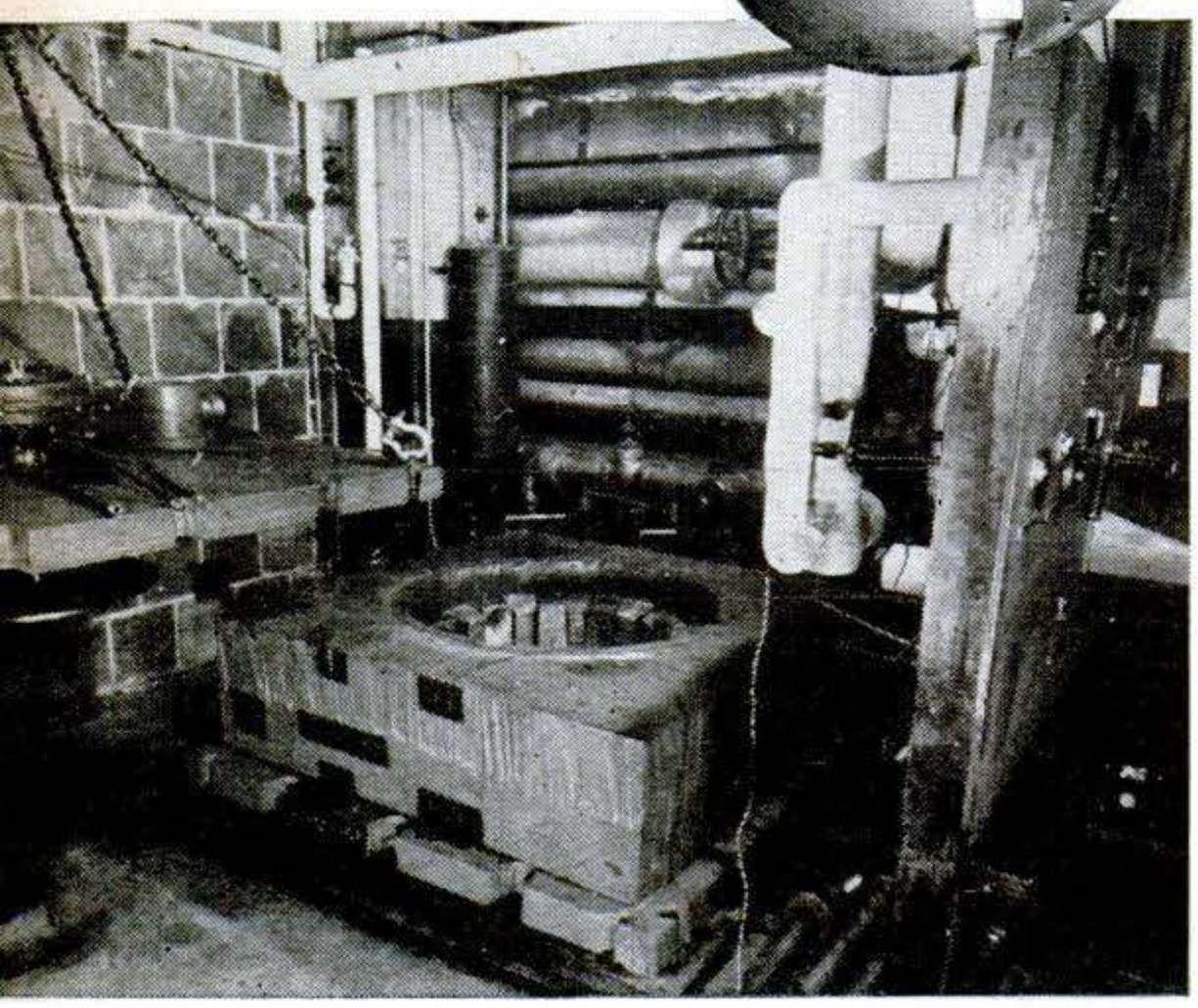
10,000 Volts for a Dollar

HERE is a bargain-basement generator that demonstrates how larger, atom-smashing machines get their power. Built by Eric F. Cave, a University of Missouri student, the half-million-volt machine is a junior version of the huge Van de Graaff generator at Massachusetts Institute of Technology.

The main machine consists of a high-voltage, biscuit-shaped electrode terminal on top of an insulating column. To make it go, a 10,000-volt direct current is sprayed on the lower part of a 10-inch-wide endless fabric belt running through the column. By this means charges are ferried up and collected at the top terminal until the desired voltage is attained. The amount of charge delivered at the top depends on the speed at which the belt moves. Once started, the generator becomes self-exciting. For demonstration purposes, the spherical terminal shown at left is brought close to induce a miniature bolt of lightning, as long as a foot, to leap between the two electrodes, or terminals.

Made in the school machine shop, the supporting column came from junked X-ray apparatus; the motor to run the belt and other electrical parts were war surplus. Costliest items on the total $50 expense sheet were the belt and the sheet aluminum from which the shells were constructed.

This solid steel disk (right), 26 inches in diameter, burst after being whirled at 11,700 r.p.m. One with a welded center came apart at 9,200 r.p.m.

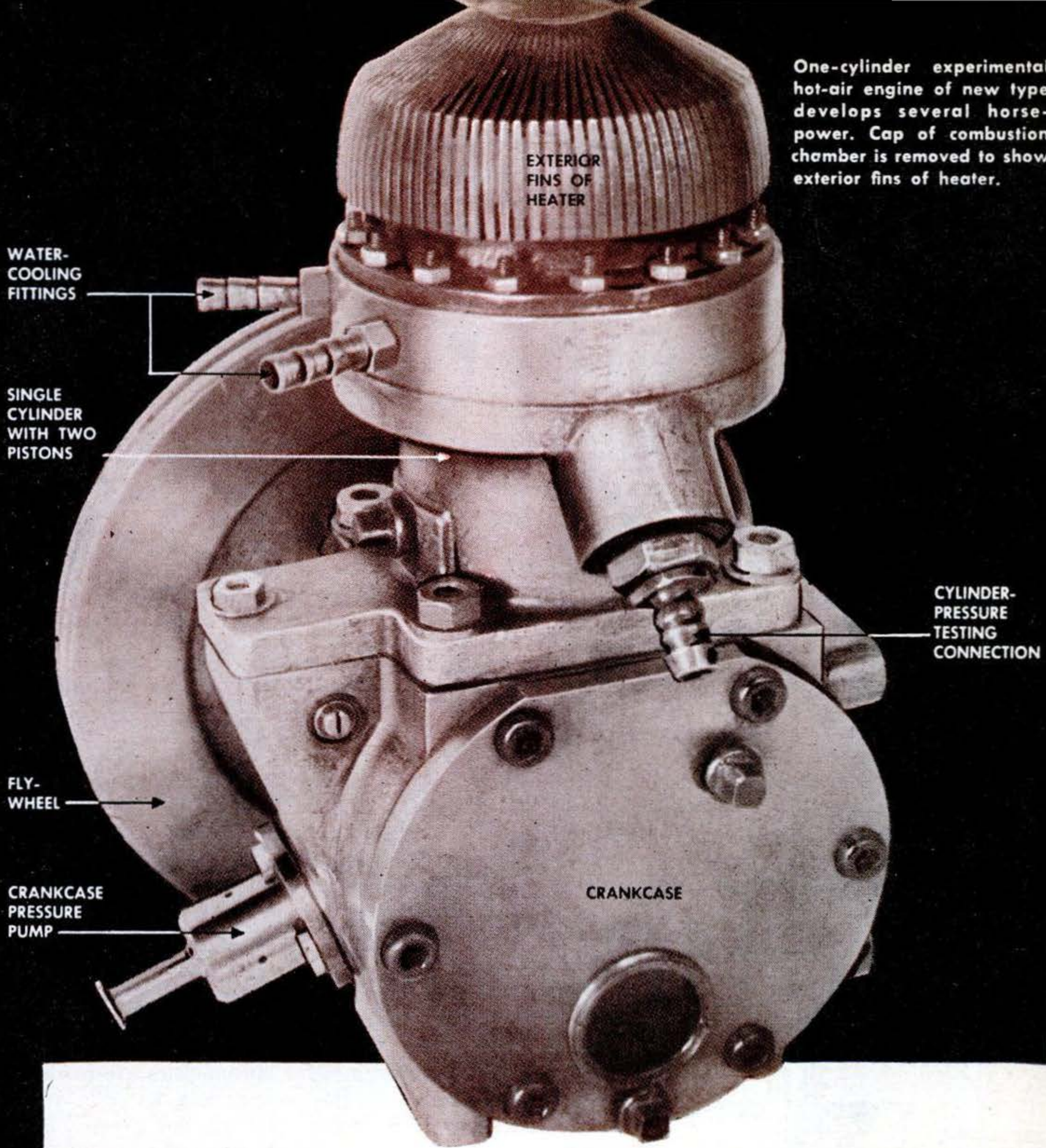


Whirl Pit Tests Steel

How tough is steel? To find out, scientists put solid and welded steel disks in this armor-plate pit and spin them around at speeds up to 35,000 r.p.m.—or until they burst. As the disks whirl at such high speeds, the material actually flows out from the center toward the outside and thickens the edges; this is expected to provide valuable information on plastic flow.

In operation at the Massachusetts Institute of Technology under the sponsorship of the Engineering Foundation, the pit shown at left is 40 inches in diameter and nine feet deep. It is lined with lead pigs that preserve the disks for observation after they burst. A vacuum is created within the pit and the test disk is spun around by a flexible steel drive shaft; the vacuum prevents generation of heat as the plates are rotated and makes it possible to stop the whirling at any moment by letting in air. Another feature is that the machine can test materials at extremes of temperature.

Copyrighted material



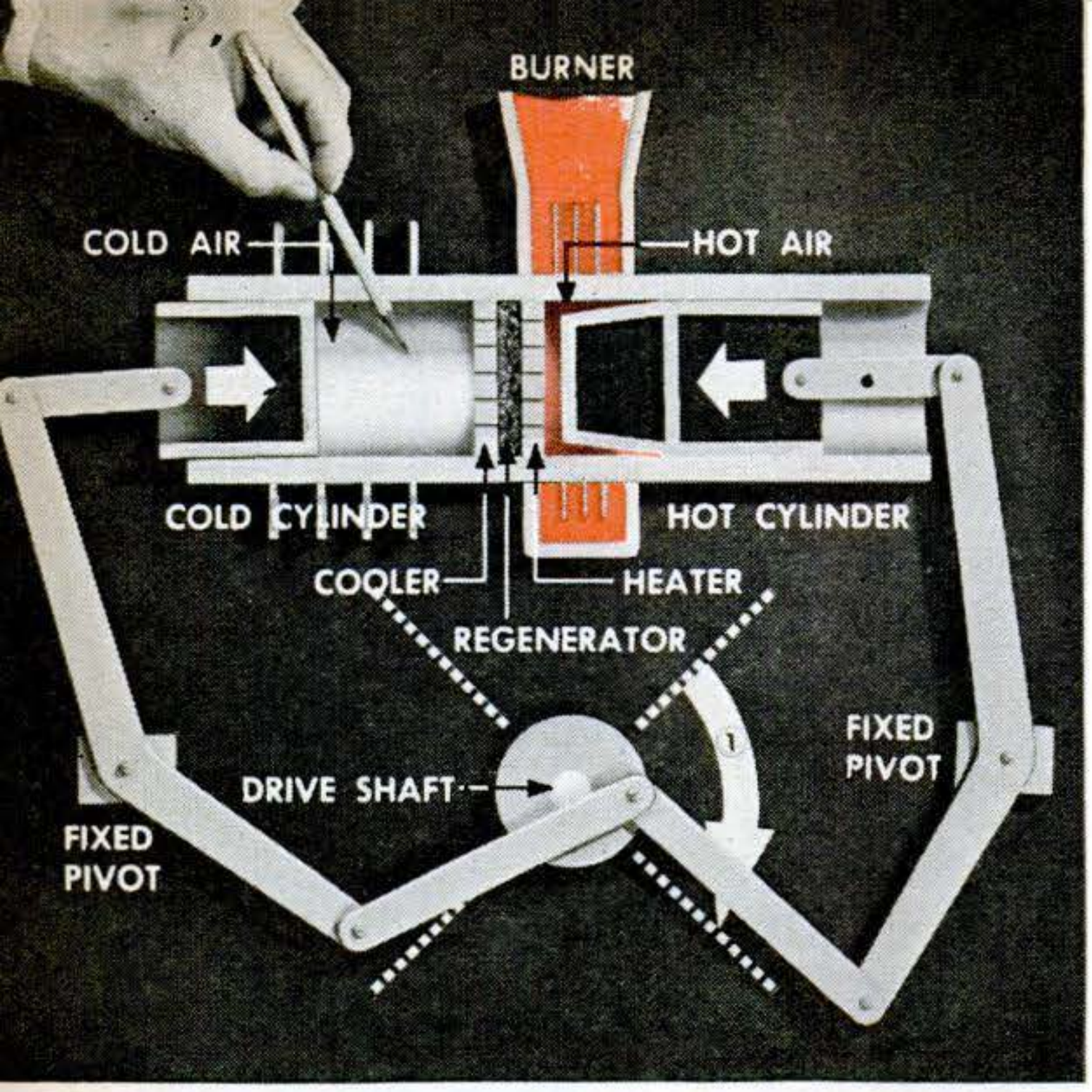
One-cylinder experimental hot-air engine of new type develops several horsepower. Cap of combustion chamber is removed to show exterior fins of heater.

Will the Old Hot-Air Engine Drive the New Cars?

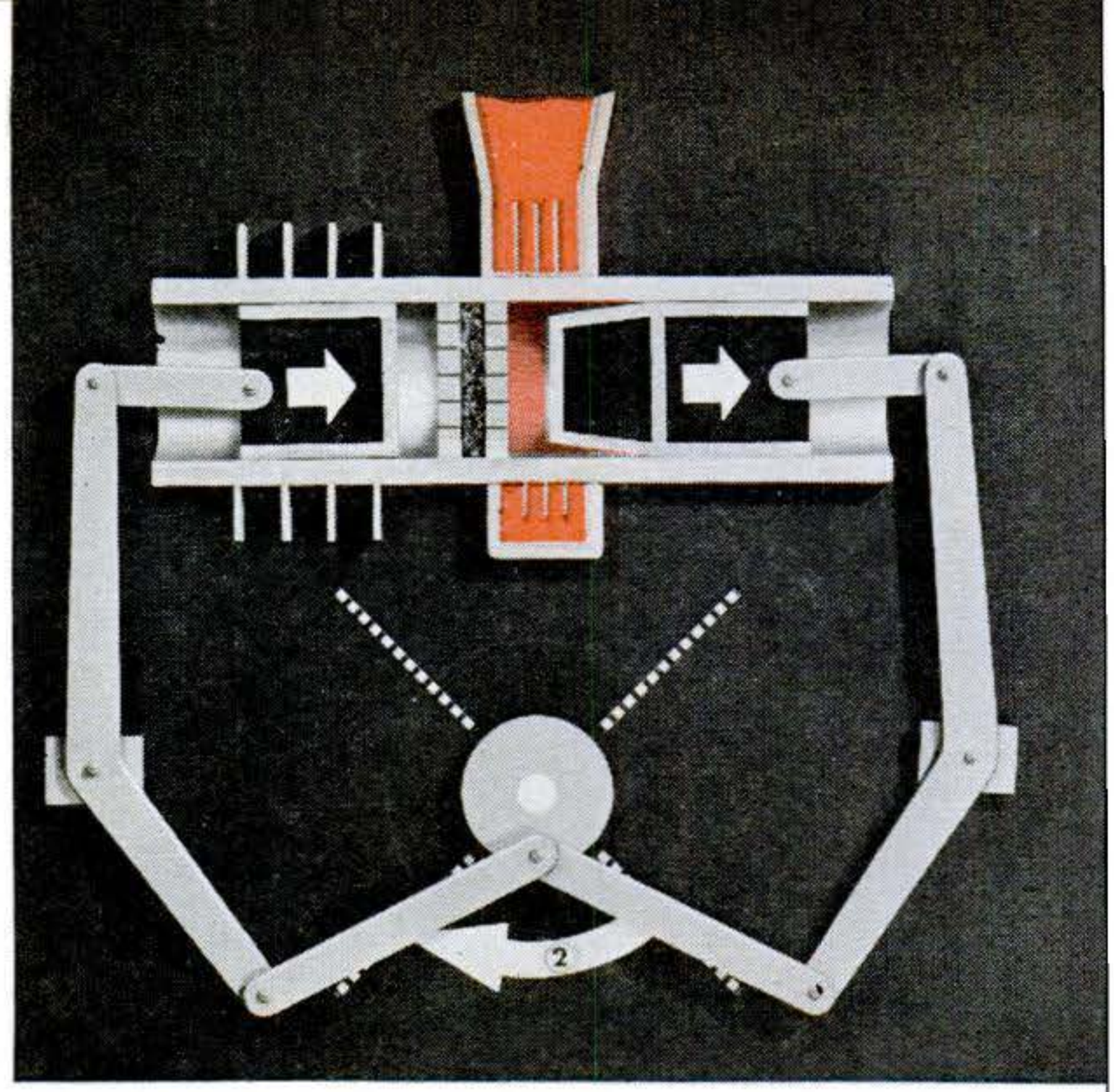
By Alden P. Armagnac

ARE hot-air engines, unsuccessful rivals of steam power a century ago, ready for a comeback? A streamline, 1948 version of an engine driven by expanding air, just announced by the Philips electrical works of Eindhoven, Holland, foreshadows that startling possibility.

A Scotch clergyman, Robert Stirling, devised its ancestors in the early 1800s. Thousands of hot-air engines came into use, in America as well as in England and France, for pumping water and other light tasks. Designs and available materials of those years, however, made the engines inefficient, slow, and bulky, and other forms of power eventually outmoded them. They seemed destined to remain a forgotten chapter in the history of mechanical progress. Then,

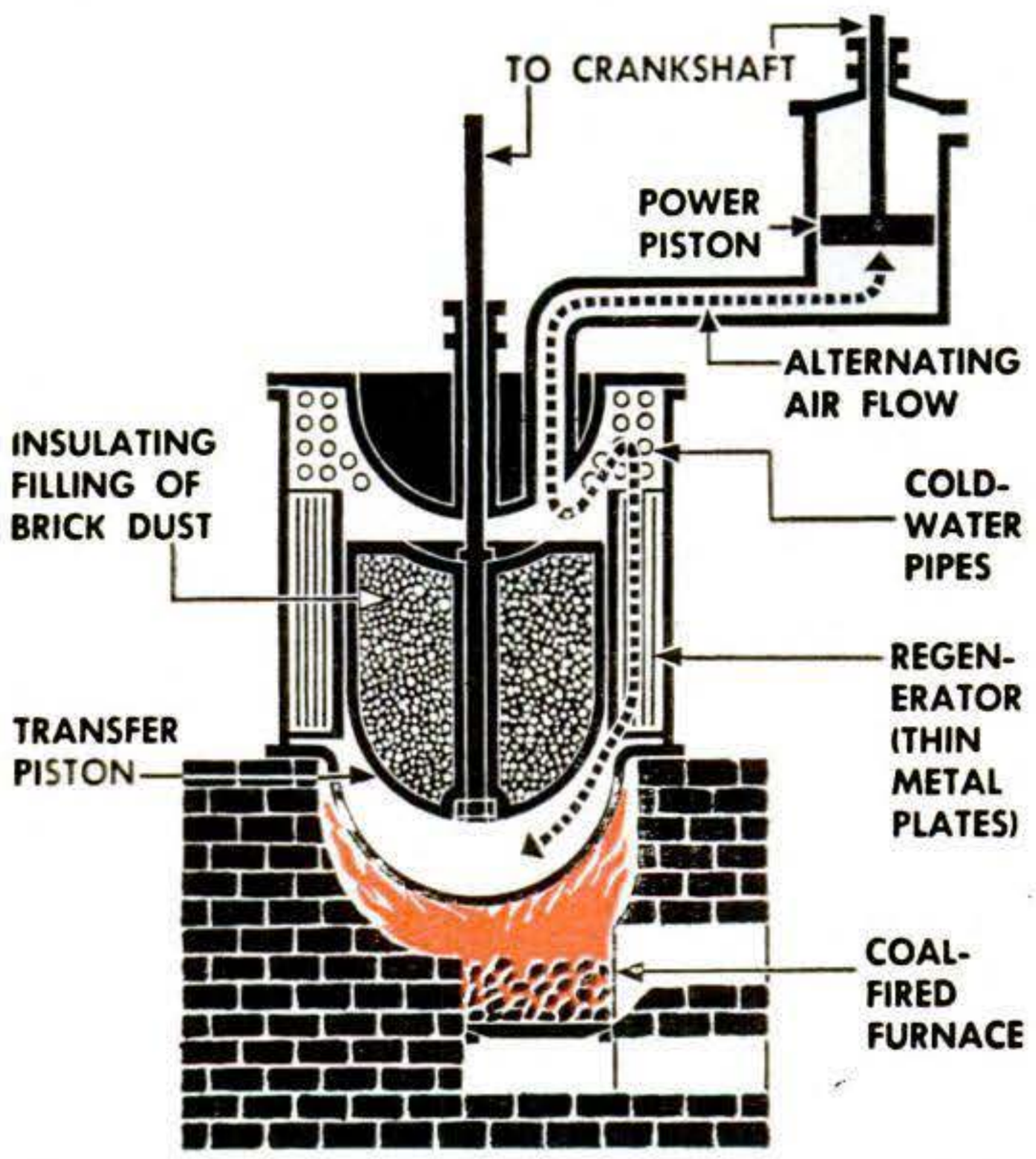


1. Compression stroke is first shown of four movements of Philips hot-air engine, demonstrated here by cutaway model. Short arrows show both pistons moving inward, compressing air mostly in "cold" space indicated, during travel of crankpin marked by curved arrow.



2. Transfer stroke now moves compressed air from cold cylinder to hot cylinder without change in volume, and air picks up heat from regenerator and heater. During this stage, both pistons travel from left to right, as will be seen by study of ingenious W-shaped linkage.

seeking a convenient source of power for radio sets in rural districts without electricity, Philips engineers became interested in the possibility of bringing the hot-air engine up to date—and fascinated by what they found modern design could do for it.



Pioneer hot-air engine, Stirling type of early 1800s, was this ponderous machine. Thousands of hot-air engines were built in the nineteenth century, but were superseded by other forms of power. Lightweight and efficient high-speed design now foreshadows their comeback.

Today they have built and successfully tested models ranging from two to 15 horsepower, and plans for others up to several hundred horsepower are ready. Laboratory trials of the new types give performance figures that the producers themselves, at first, could hardly believe. For the modern hot-air engines, careful tests show, surpass gasoline engines and even approach Diesel engines in efficiency!

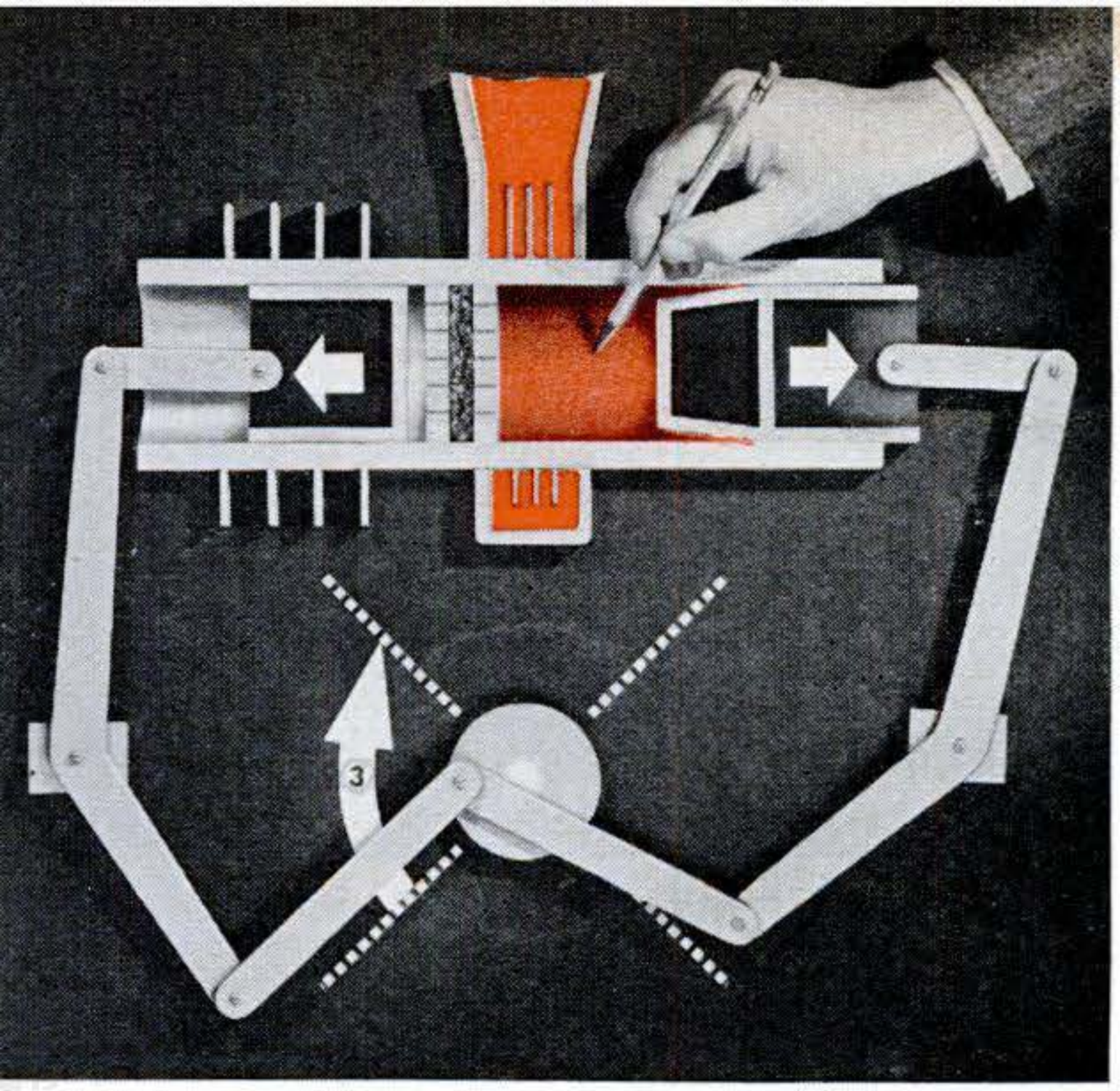
Hot-air engines for automobiles are made practicable by the new design, its sponsors declare. The smooth, cushioned power, in contrast to the impact of explosions in an internal-combustion engine, would simplify or perhaps dispense altogether with transmission gears. Another advantage would be long life, since absence of corrosive gases and extreme, high temperatures would minimize wear between pistons and cylinders.

Other applications foreseen include electric generating plants for homes and perhaps for larger-scale power production.

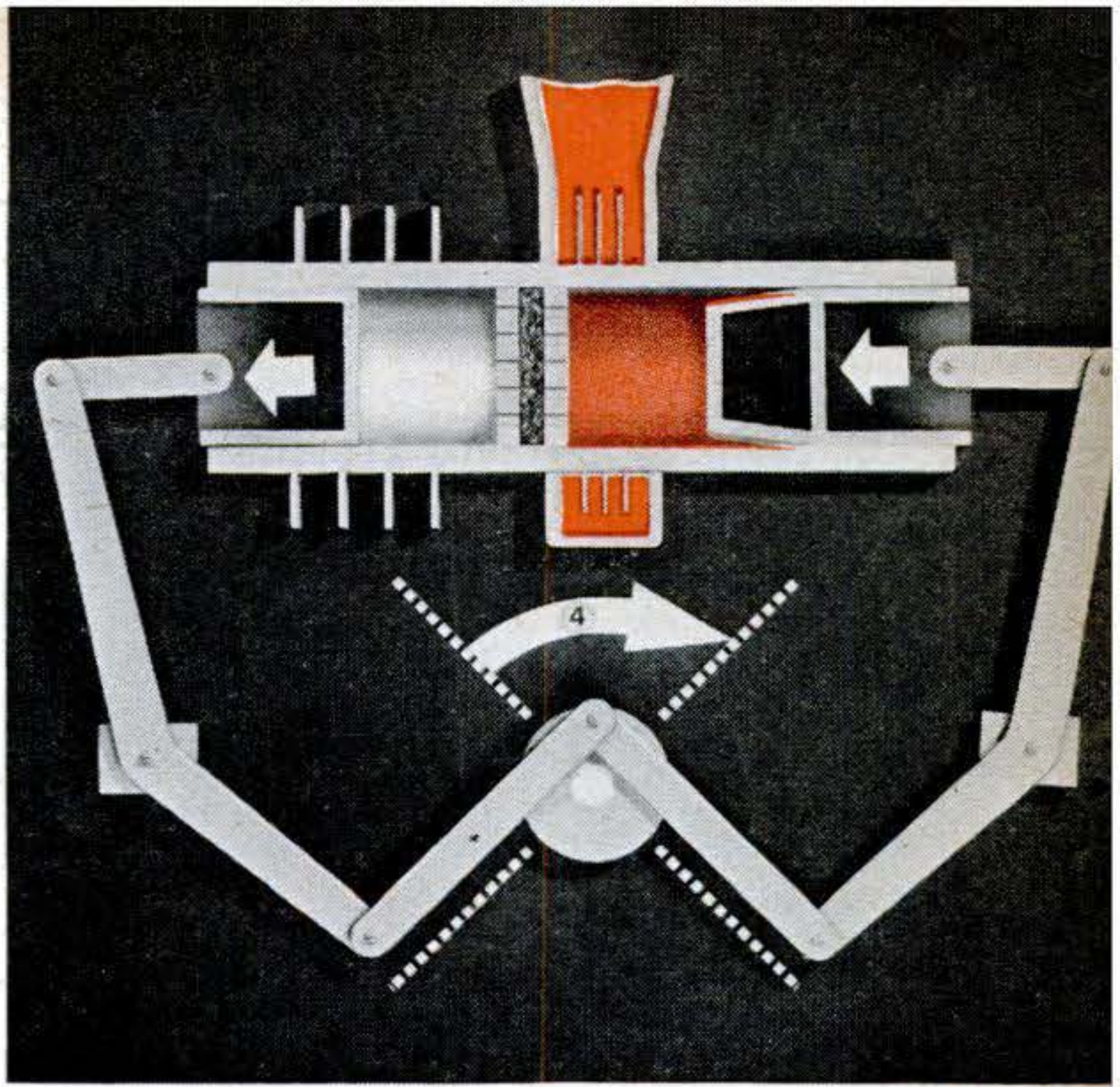
To those who have watched it run, one of the most remarkable features of the Philips hot-air engine is its silence. It has no exhaust, no valves, no explosions in its cylinders. Hence a 15-horsepower hot-air engine, large enough to drive a small car, makes no more noise than a sewing machine.

Since it uses an external burner, instead

Copyrighted material



3. During power stroke, heated air expands, mostly in "hot" space indicated, driving both pistons outward. Amount of power delivered exceeds the amount consumed in other three movements of complete cycle, and the surplus represents the useful output of the hot-air engine.



4. Transfer stroke now moves expanded air, without change in volume, back to cold cylinder. Air gives up most of its heat to regenerator, rest to cooler. Then whole cycle begins again. First Philips engine was patterned after this model and ran successfully.

of igniting an explosive vapor in a cylinder, a hot-air engine isn't choosy about its fuel. It can run on gasoline, oil, gas, wood alcohol —practically anything that will burn.

Just as new heat-resisting alloys made possible the development of jet engines for planes, they have been the principal factor in making hot-air engines practical. The elevated cylinder temperatures they permit have transformed the sluggish and ponderous hot-air engine of the nineteenth century into a compact, high-pressure, high-speed design turning up 3,000 revolutions per minute or more. With reduced size, heat losses can be more easily countered by insulation, lighter moving parts decrease friction, and efficiency improves all along the line.

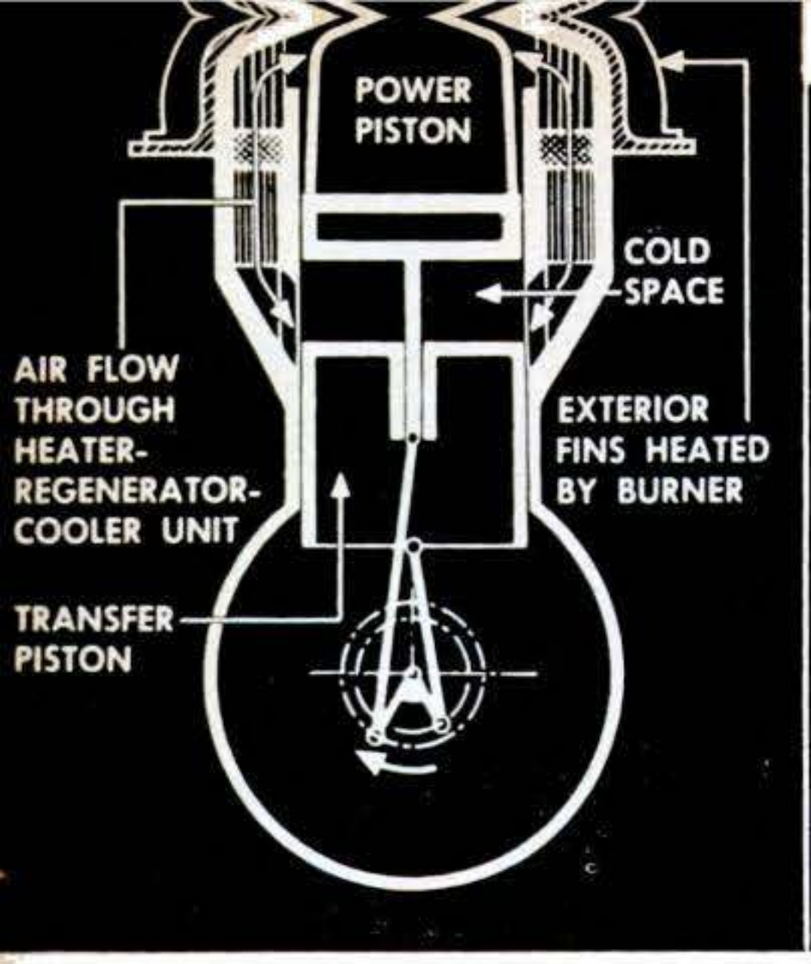
How Hot-Air Engine Works

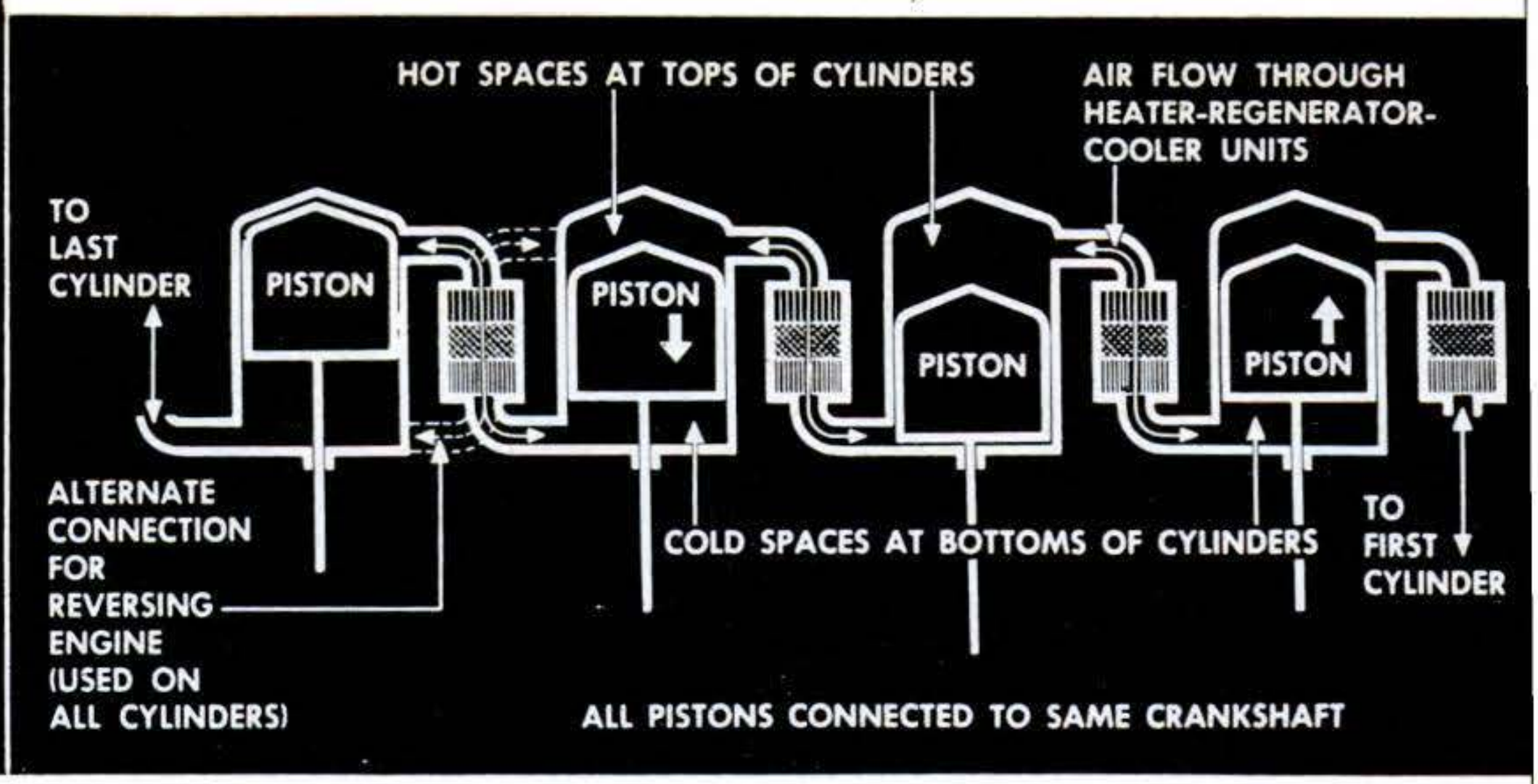
Like steam engines, hot-air engines apply the fact that a heated gas will expand and furnish power. A steam engine uses heat to turn water to a gas, steam, and the expanding steam then drives a piston. Simplest of all prime movers, the hot-air engine uses heat directly to expand air, the gas that drives its piston.

In an ideal arrangement, heated air would be allowed to expand in a "hot cylinder," driving a piston and furnishing power to a flywheel and drive shaft. Next, the expanded air would be transferred to a "cold cylinder." Here another piston, driven by the flywheel, would compress the air to its original volume. Finally this air would be returned, without change in volume, to the hot cylinder and the cycle would start all over again. Because the pressure of the hot, expanding air is greater than that of the cooler air being compressed, the expansion stroke would yield more power than the compression stroke uses up. This net gain, resulting from heat input turned into mechanical energy, is the useful power delivered by the engine. No heat is lost in an exhaust, since the same air is used over and over again, shuttling back and forth between the two cylinders.

Actually, designers must compromise between an ideal form and a practical one. It is more feasible mechanically to let most, but not all, of the expansion take place in the hot cylinder; and to compress most, but not all, of the cool air in the cold cylinder. This can be done by arranging a pair of pistons so that the motion of one follows that of the other with a time lag or "phase difference" corresponding to about a quarter-revolution of the flywheel; it may vary a little, and need not be exactly 90°. With an experimental engine patterned after the model illustrated above, Philips engineers found that high efficiency could still be realized. The pictures show the four movements of

Copyrighted material



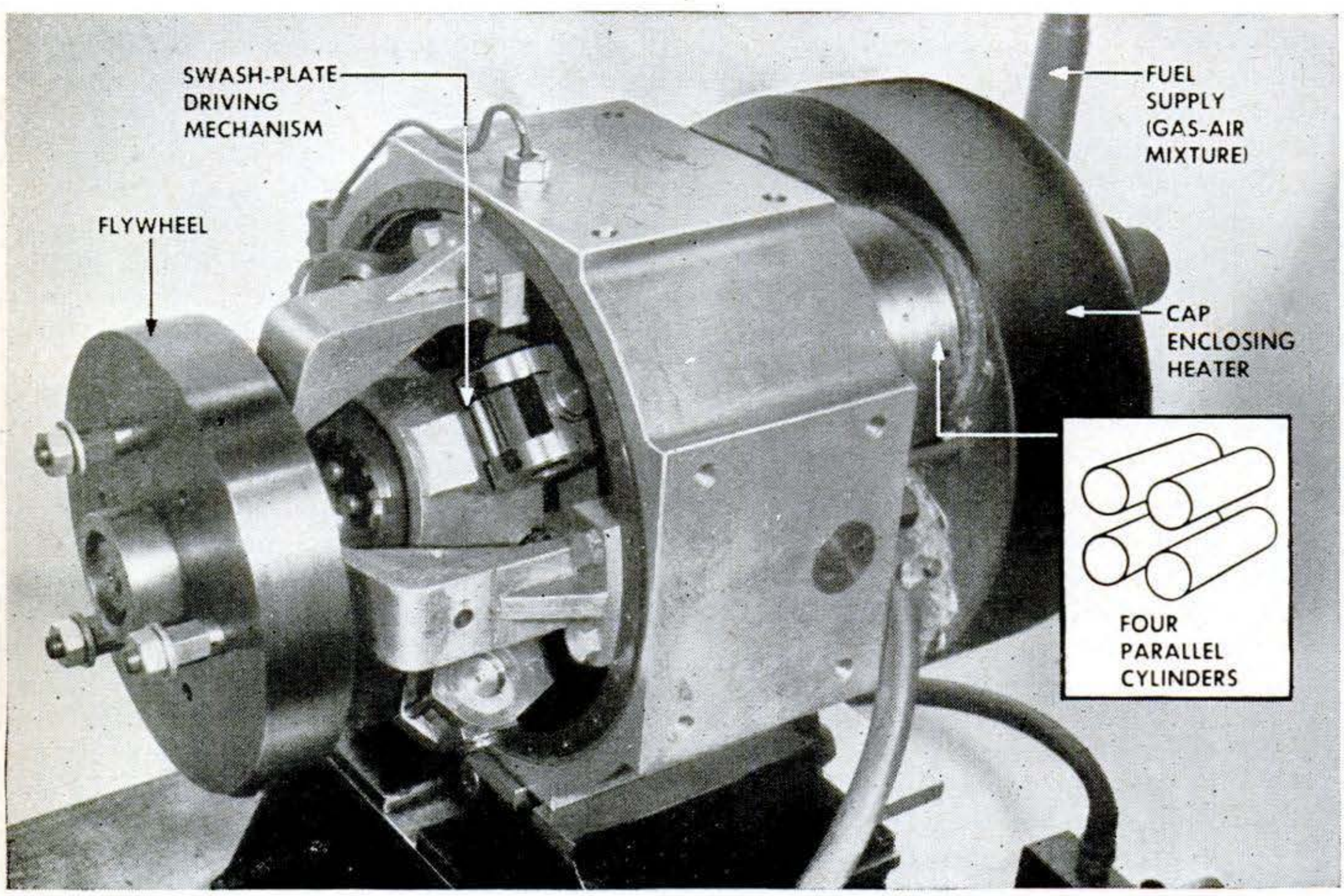


Simplified diagram at left, above, shows practical adaptation of hot-air principle in modern single-cylinder Philips engine. Two pistons operate within the same cylinder. Adding more cylinders actually makes the design simpler, as shown at right. One double-acting piston suffices in each of four cylinders, which may be grouped radially, in two Vs or in a square.

this elementary type of engine, beginning with the compression stroke.

Passing freely between hot and cold cylinders, air moved by the pistons alternately flows in opposite directions through the same passages of an assembly consisting of a heater, a cooler, and a regenerator.

The heater is a piece of aluminum bronze, an alloy that conducts heat well. It has exterior fins to pick up heat from the burner; and interior fins, forming a honeycombed passageway, that transmit this heat to air passing between them. The cooler is built almost exactly like the heater, with fins on the inside that remove heat from the air, and fins on the outside to be cooled either by air or by a water jacket. The regenerator, a thermal storage device designed to absorb heat almost instantaneously and give it up as quickly, is a porous mass of thin metal



Four-cylinder Philips hot-air engine, only 19 inches long over-all, develops 15 horsepower, enough to drive a small car. It turns up 3,000 r.p.m. and runs as quietly as a sewing machine.

Copyrighted material

wire between the heater and the cooler.

This "heat reservoir" has the important job of taking most of the heat out of the air as it passes from the hot cylinder to the cold cylinder, holding this heat momentarily, and then restoring the heat to the air as it returns from the cold cylinder to the hot cylinder. That leaves the cooler with much less work to do and prevents serious heat loss. A temperature of about 1,200° F. is maintained in the hot cylinder and 175° F. in the cold cylinder.

Following successful tests of their first engine, Philips experts have applied the same principle in improved designs.

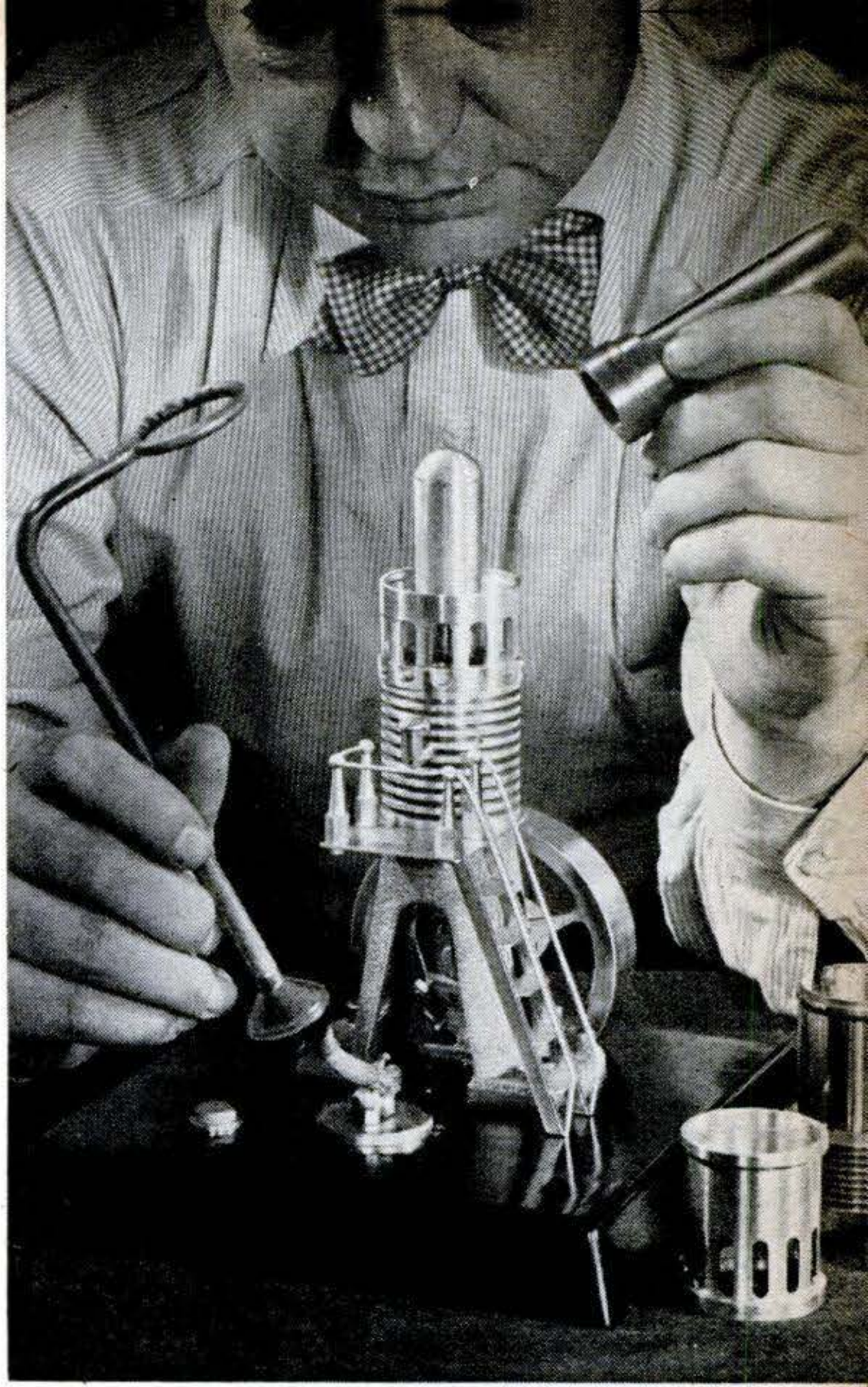
A little one-cylinder model develops several horsepower. Its two pistons work in the same cylinder, part of which serves as the hot space and part as the cold space. An added refinement, not shown in the simplified diagram on the opposite page, is a pump that keeps air in the crankcase under the same pressure as that in the cylinder. This counterpressure obviates need for a tight-fitting piston to prevent air leakage past it, and also reduces bearing load. The effect on efficiency is so great that the engine's power can be controlled by an adjustment that varies the pumping rate.

Multicylinder Models

Multicylinder hot-air engines, instead of complicating the design, actually simplify it. When four cylinders using single pistons are suitably interconnected as shown in another diagram, a hot space at the top of each cylinder constantly exchanges the air it contains with a cold space at the bottom of the next cylinder. Each piston delivers power on its downstroke and acts as a compressor on its upstroke. The pistons have a 90° "phase difference." When No. 1 is at the top of its stroke, No. 2 is descending and delivering power, No. 3 is at the bottom of its stroke, and No. 4 is rising and compressing air.

For a good arrangement with short interconnecting passages, four cylinders may be arranged in radial fashion, grouped in two Vs, or set in a square. In the last type, suitable for up to 30 horsepower, pistons drive plungers acting against an inclined disk, called a swash plate, that turns the shaft.

The wide range of available designs emphasizes the variety of purposes to which the new engines may be adapted. Robert Stirling may yet take place with Robert Watt as a prophet of the Age of Power. END



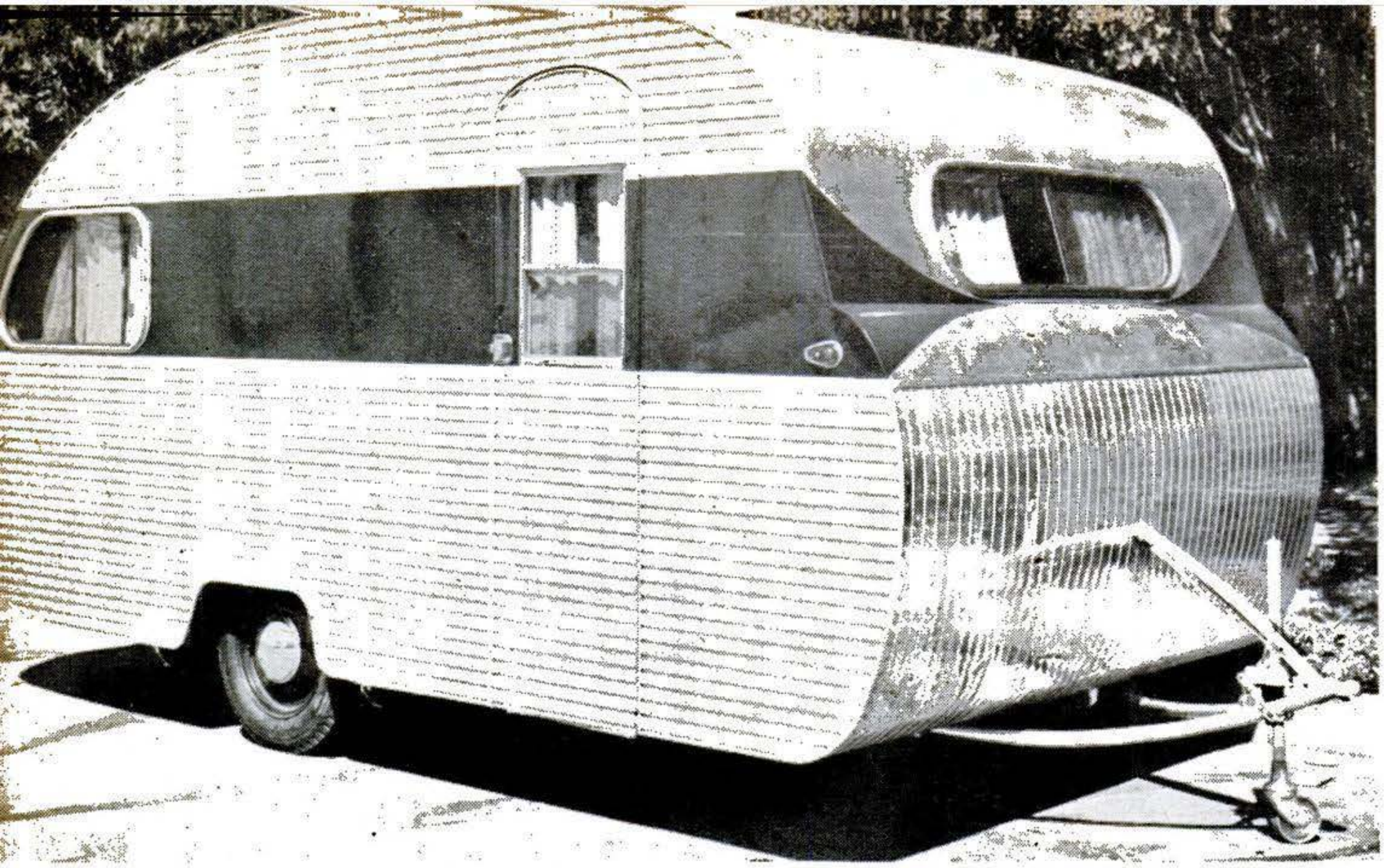
By applying the principle of a hot-air engine in miniature, Joseph Tracy, a New York automotive engineer, provides the actual motive power for a model of a Diesel engine, above, that he has built. When a ring-shaped alcohol burner is attached as shown and lit, a pair of pistons begin operating, and the tiny flywheel spins merrily. A handsome example of precision craftsmanship, the model has a power cylinder of half-inch diameter and a one-inch stroke.

Applications of hot-air engines in recent years have been limited to driving models and toys and to stirring chemicals in laboratories, because of their low efficiency, slow speed, and bulkiness. "Even with these drawbacks," model-maker Tracy commented, "this principle is worth serious study. Possibly by the use of modern materials and scientific design, this type of engine might be vastly improved." As if to confirm his words, news of the efficient new hot-air engines described in the preceding article reached this country almost simultaneously.

Chemical Prevents Stocking Runs

NYLON runs will become less frequent when stockings are treated with Syton, a run preventive developed by the Monsanto Chemical Co. Syton also removes the shine from the surface of cotton, wool, and rayon fabrics, and makes them more durable and hard-wearing.

Copyrighted material



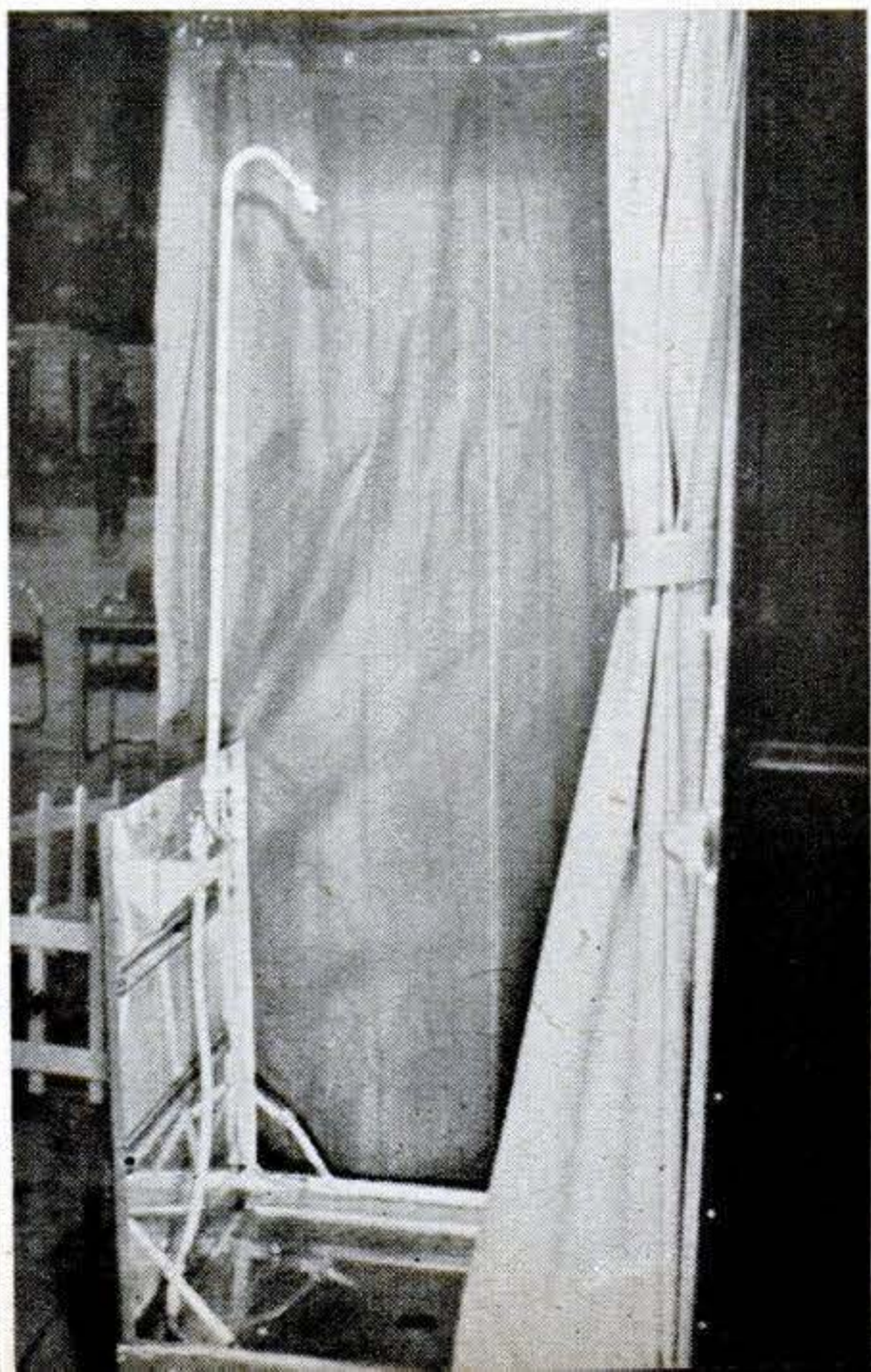
Built like an airplane, the Kit Companion trailer is said to be among the lightest riding jobs now on the market. In place of the usual frame with the body bolted to it, the Companion is made of light tubular steel formers to which the corrugated skin is riveted. Built in Long Beach, Calif., the trailer features a portable shower, shown in the three pictures below.

New Luxury En Route

Latest trailers feature apartment conveniences and comfort.

The doorstep below, at left, is really part of the Kit Companion's portable shower—and the awning doubles as a shower curtain. Packed away for traveling, the shower box is opened for use by lifting its top and pulling out the detachable piping system, center, below.

Hitch the hose connection to a water supply, pull around the shower curtain—and let her rip! Like a regular shower, the Companion's portable has faucets for either a hot or cold spray. The hot water is produced by an electric heater built into the trailer.

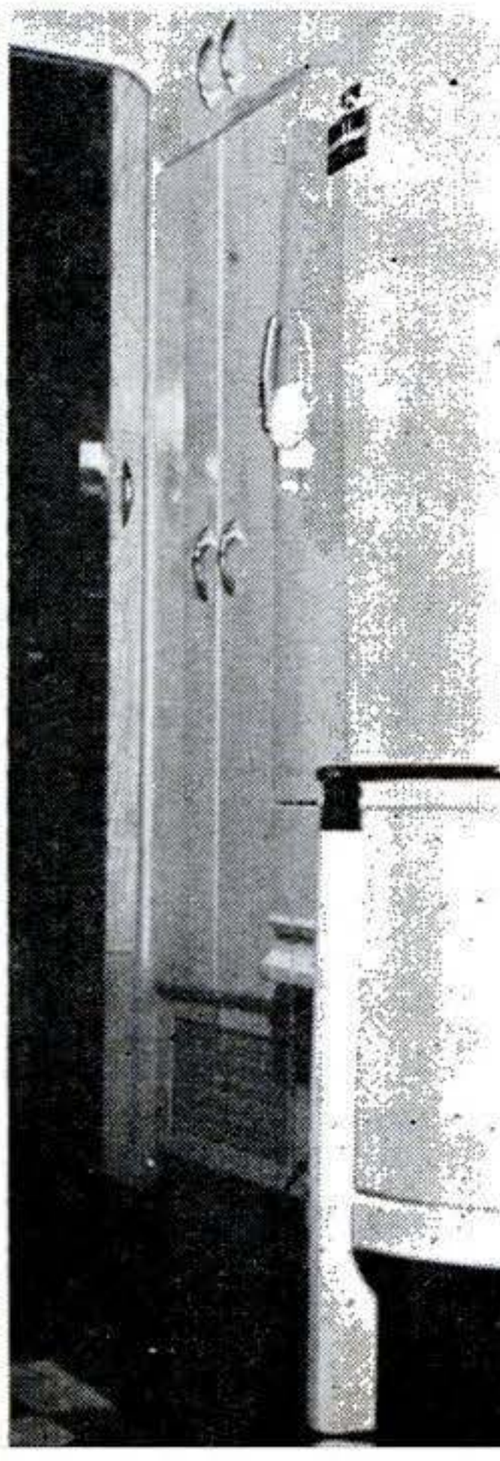


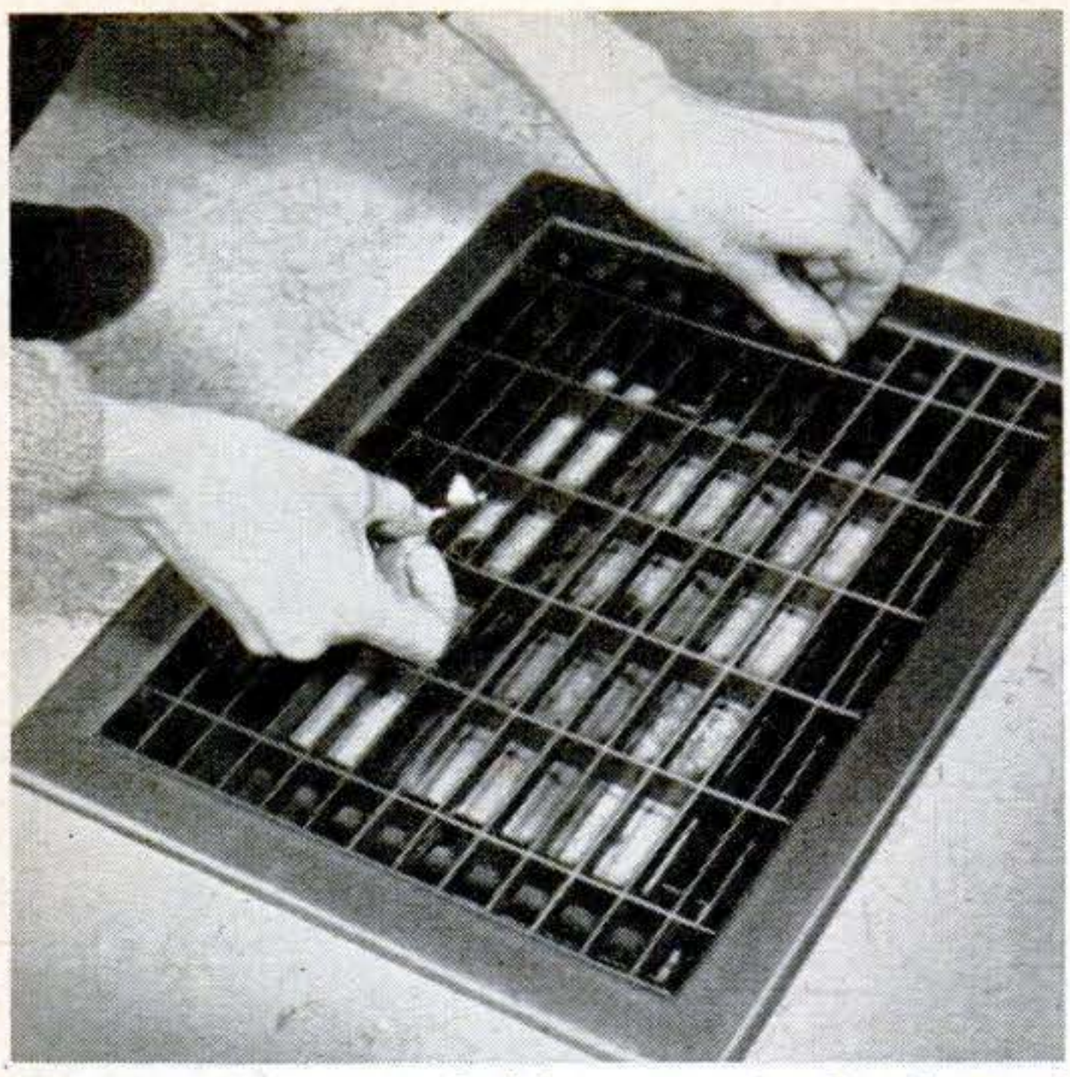
Copyrighted material

The Empress is a trailer for people who don't throw stones—almost half of it is glass. Behind the three-decker window panel are screens so that it can be opened up in summer without inviting wandering insects. In addition to a bathroom complete with a toilet and a stainless-steel stall shower, the Empress boasts a folding wall, shown below at right, that divides the living room into two bedrooms. The accordion screen is made of heavy, soundproof leatherette. The Empress is manufactured by the Duo Coach Corporation, of Chicago.

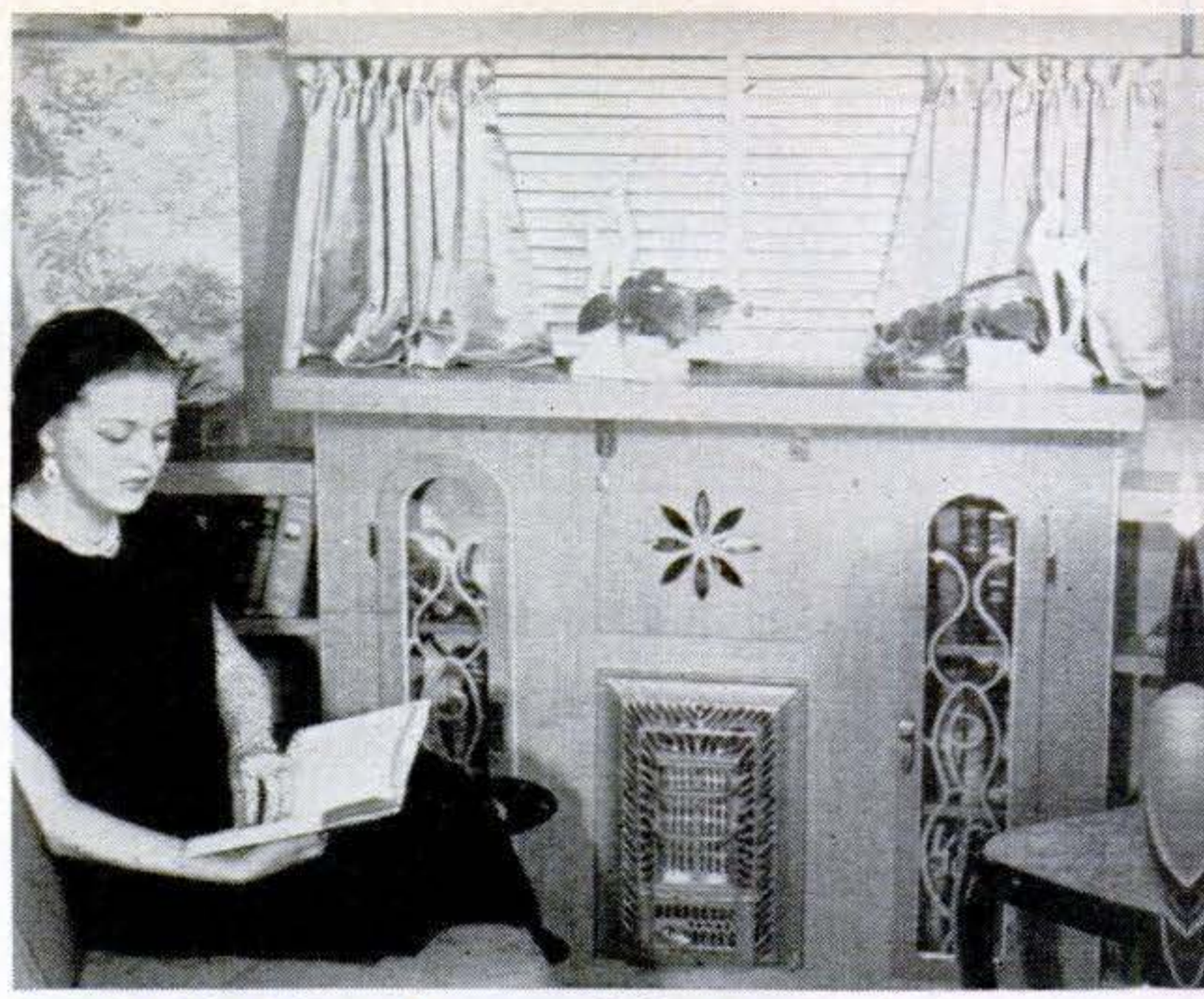
Here's a dinette table that unfolds from a kitchen cabinet. Made by Howard Industries, Inc., of Saginaw, Mich., it is shown below, left, with the table down. In the background are the cabinet's three rows of shelves that hold dishes or kitchenware. The table seats four persons.

A washing machine is fitted into the Homette, made by the Travelite Trailer Co., of Chicago. It is shown below, center, in a kitchen composed entirely of metal cabinets. The Homette also has an exhaust fan built into the ceiling and a water tank to provide a portable water supply.



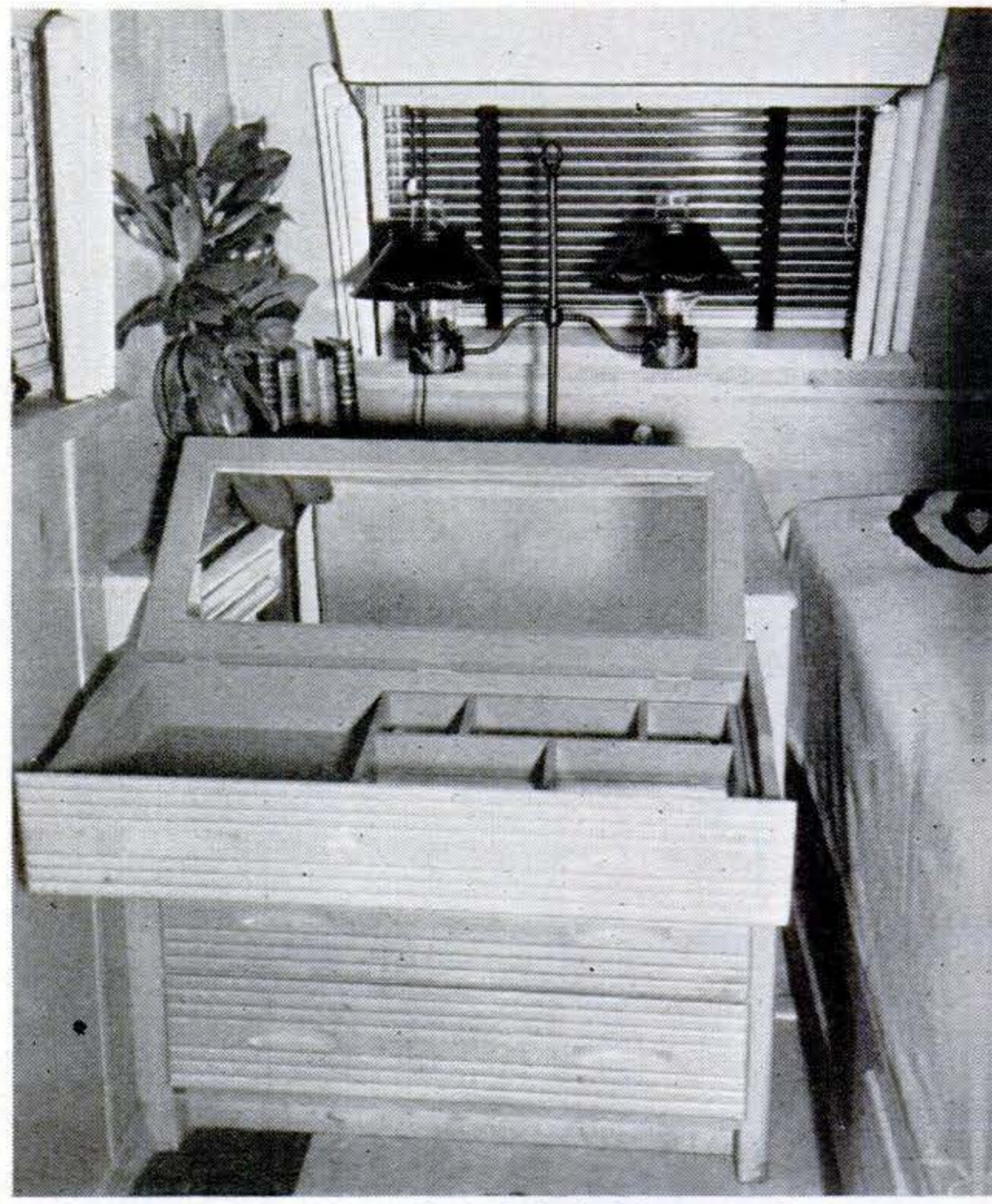


This gas heater is hidden away in the floor of the Nimrod trailer, made by the Nappanee Trailer Co., of Nappanee, Ind. The heater burns gas from a pressure tank carried at the front of the trailer and draws in clean air through the floor. Its use eliminates the usual ugly pipe stove in the trailer's living room.



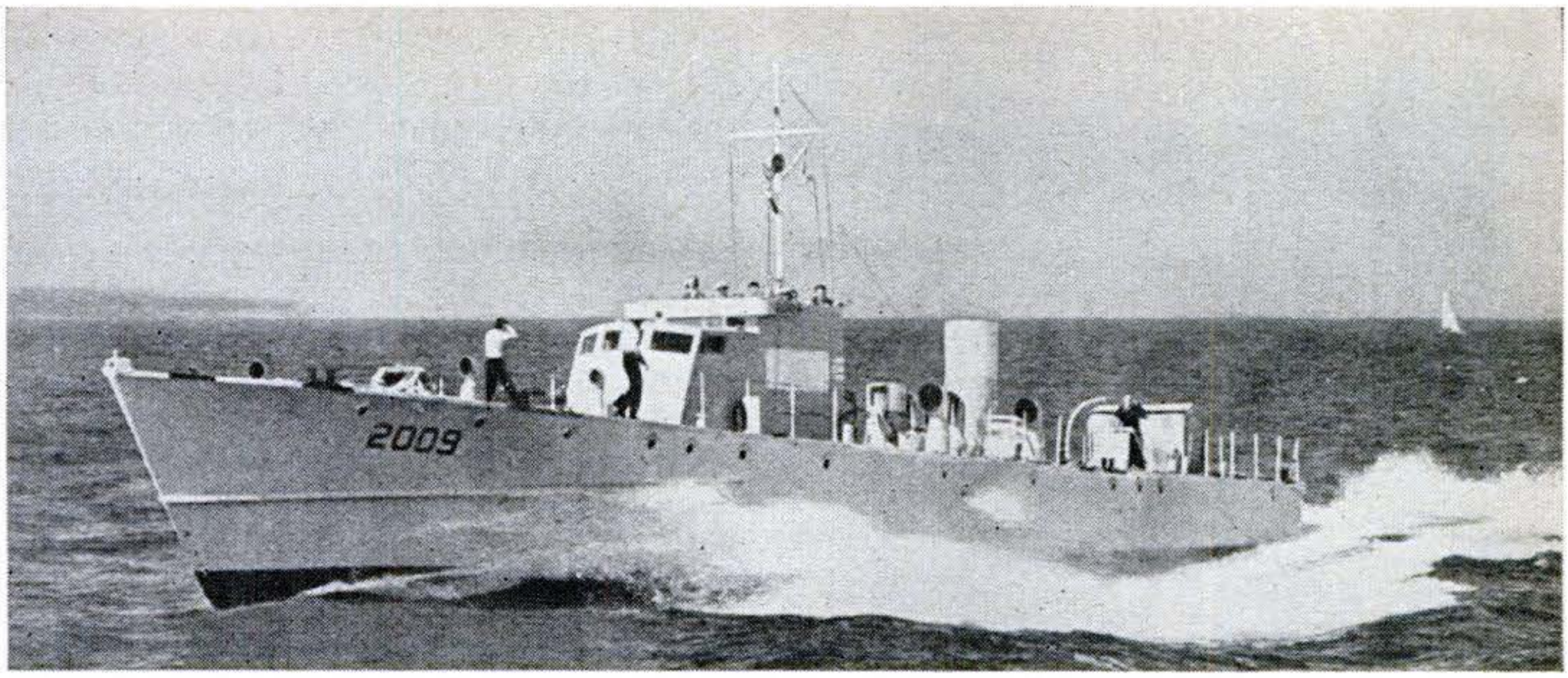
A "fireplace" is the special feature made by the Platt Trailer Co., Inc., of Elkhart, Ind. The hearth is really a gas heater, fed by a tank. An exhaust fan installed directly above the heater unit circulates warm air throughout the trailer. The cabinets built in at either side of the heater can be used as bookcases.

A nursery is provided in this trailer so you can take the kids along. It not only includes this crib, but blue-and-pink lacquered furniture, a rocking chair for middle-of-the-night attention, a diaper hamper, and a bureau that pivots out to reveal a lavatory. They're all in the Schult Custom Aristocrat, from Elkhart, Ind.



This chest, shown at the Philadelphia Trailer Show, leads a double life. An ingenious piece of trailer furniture, it combines a bureau and a vanity table. The top drawer slides out, the top folds back to reveal a mirror on the underside—and here's a dressing table with plenty of room for cosmetics and toilet articles.

Copyrighted material

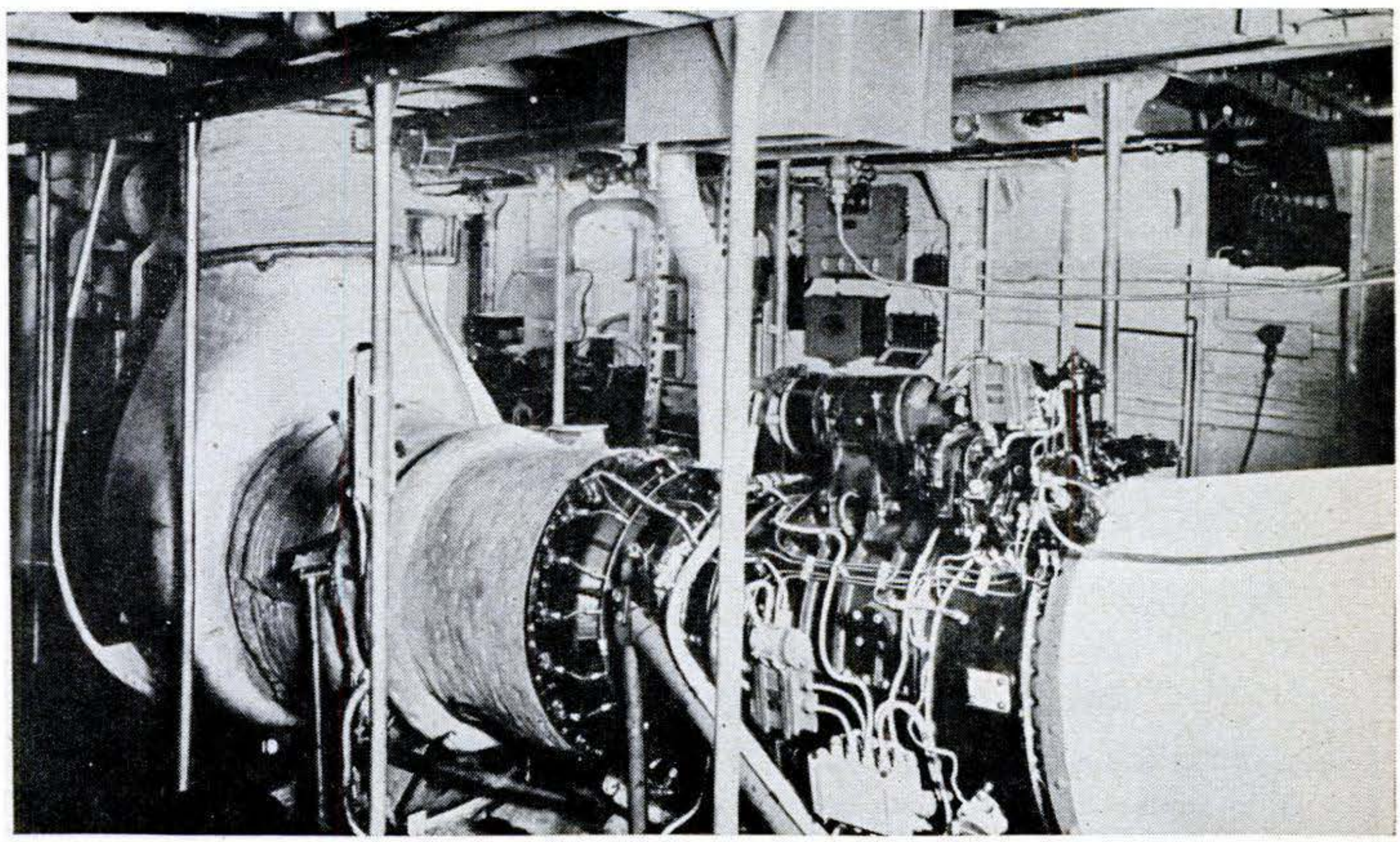


Stubby exhaust stack aft of the 2009's bridge is only visible evidence of her new power plant.

Air's Gas Turbine Goes to Sea

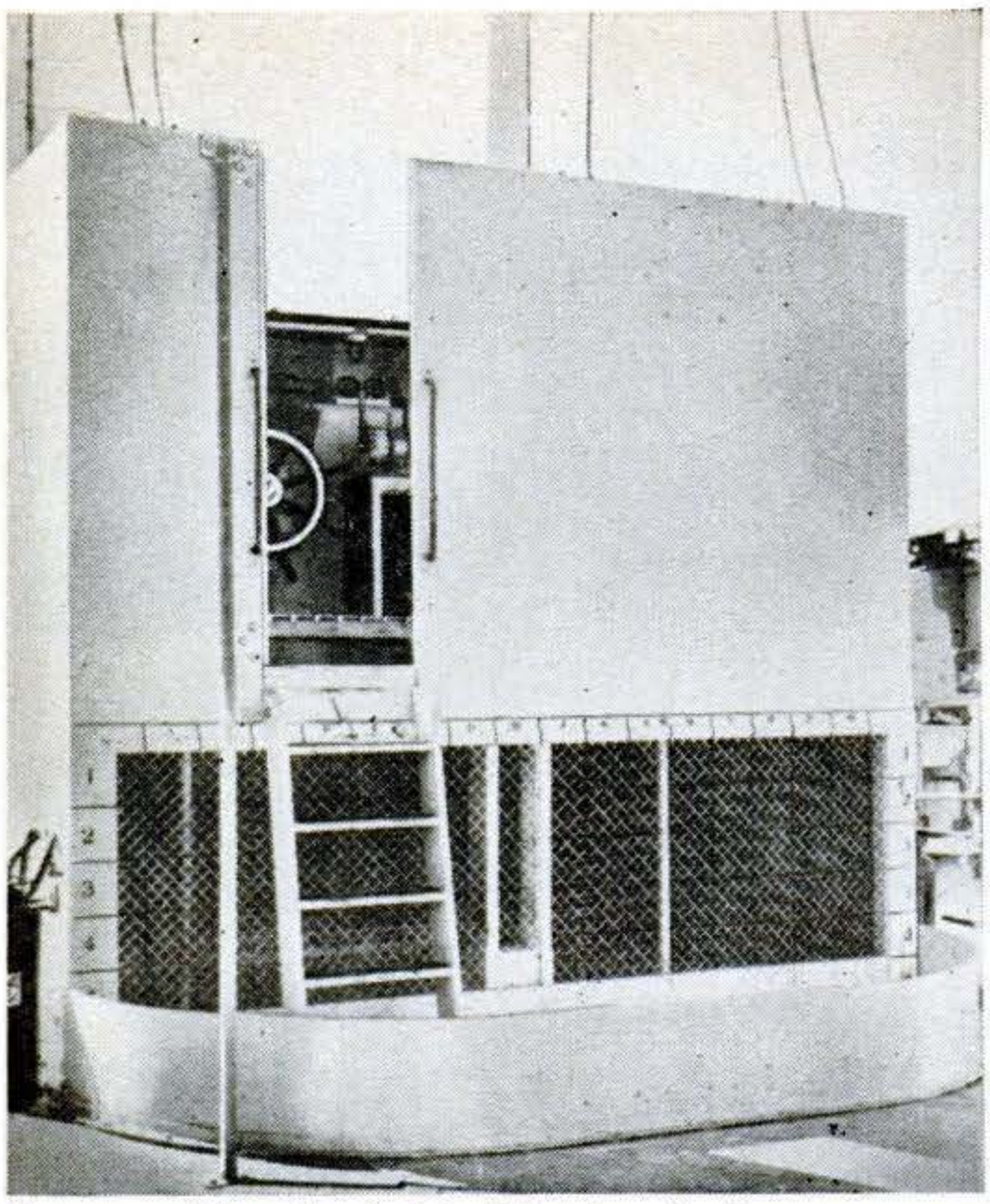
THE British Navy's MGB 2009 began life as just another 110-foot motor gunboat, her triple screws driven by three 1,250-horsepower Packard gasoline engines. Progress caught up with the 2009, however, and now she is undergoing sea trials as a brand-new kind of ship—the world's first naval vessel with gas-turbine propulsion.

Like many another maritime guinea pig, the experimental 2009 is a hybrid. Only one of her reciprocating engines has been replaced with a turbine; the other two still supply normal cruising and reverse power. The turbine itself is merely a modification of an axial-flow power plant originally developed for aircraft. But it turns out 2,500



From starboard, looking aft, turbine's exhaust is at far left; its white casing extends forward around power rotor and combustion chamber. Compressor section is left without a casing.

Copyrighted material

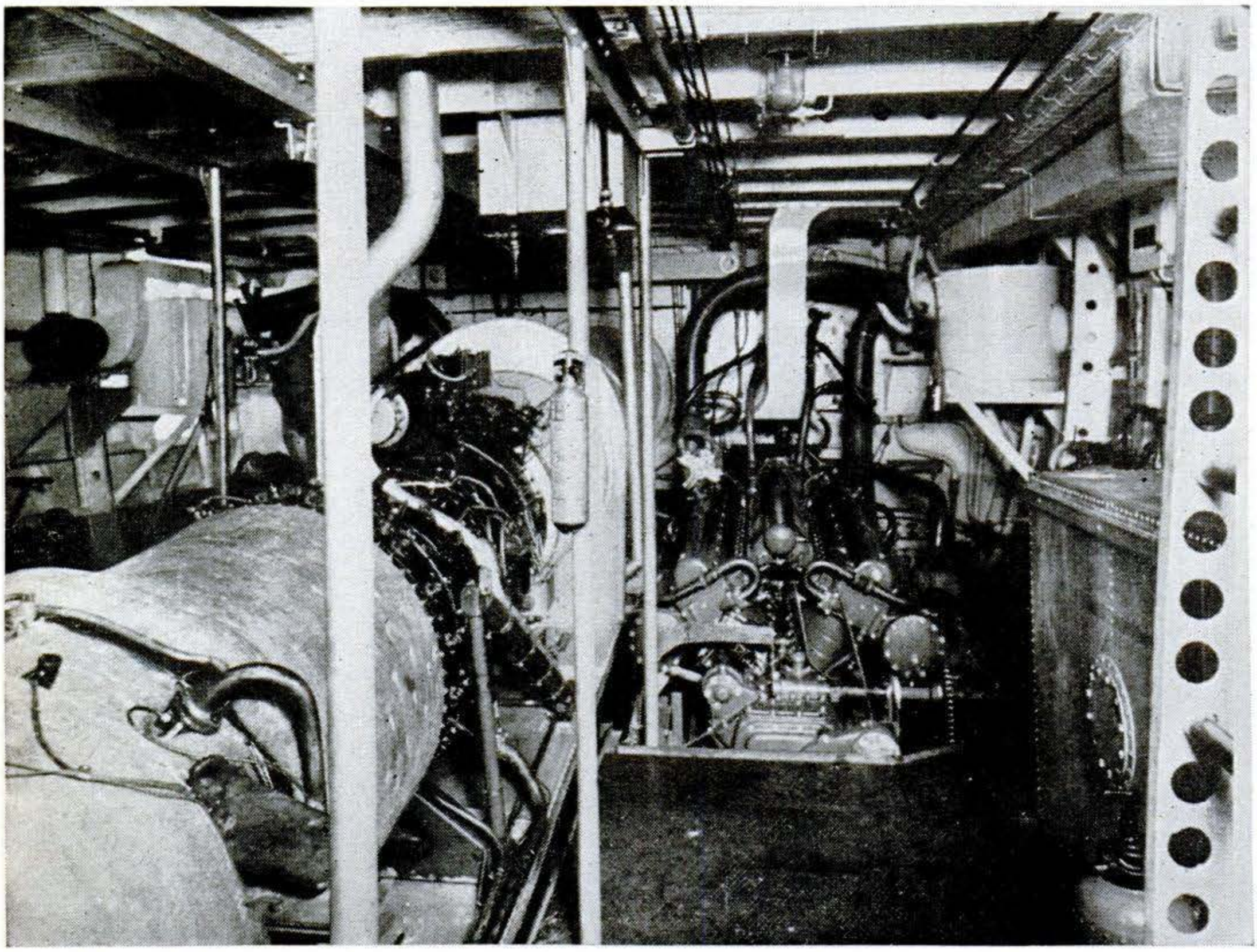


Screened intake behind bridge feeds nine-stage air compressor. After combustion, gas spins a two-stage rotor to power compressor; an independent four-stage rotor drives the propeller.

horsepower for full-speed-ahead maneuvers.

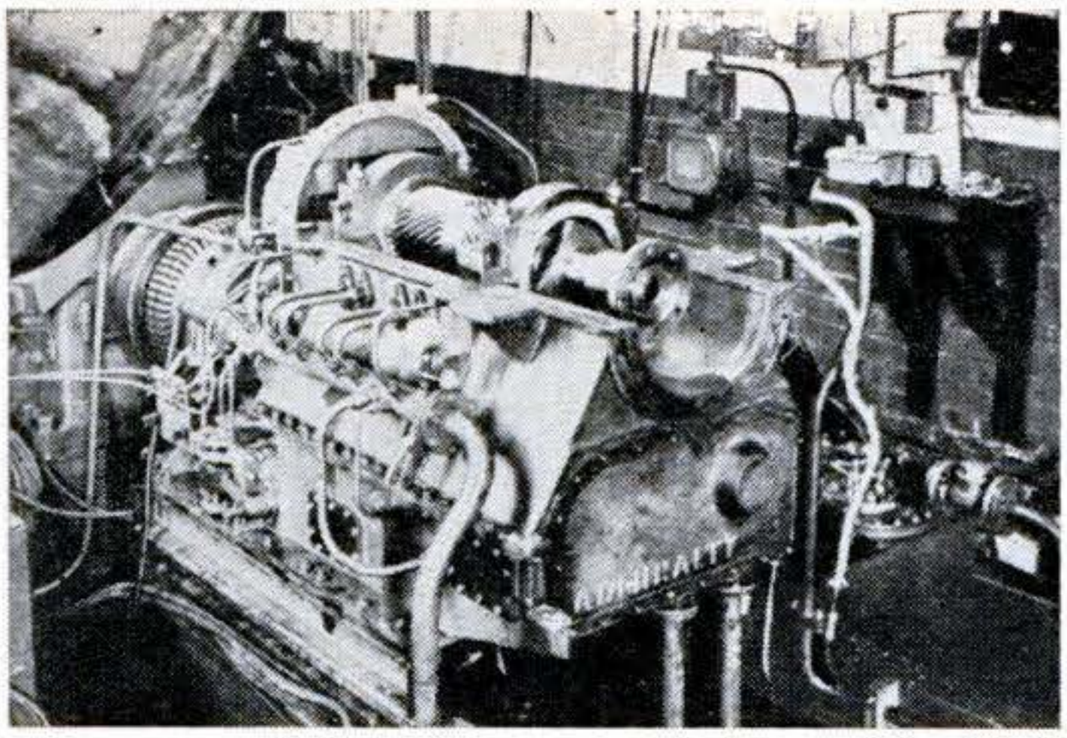
In testing the 2009, Royal Navy experts are not out to set speed records, although the new power plant has boosted the ship's speed from 30 to 34 knots. They are more interested in exploring the advantages of gas-turbine drive: more power per pound, ease of control, simplified maintenance, rapid acceleration, and, in large vessels, a saving of space. One limitation is greater fuel consumption, but the Admiralty has got around that by making the gas turbine a supplementary source of power, requiring fuel only for short periods. Using the original engines for reverse drive also dodged such problems as that of a reversible-pitch propeller; you can't make a high-speed turbine suddenly go backwards.

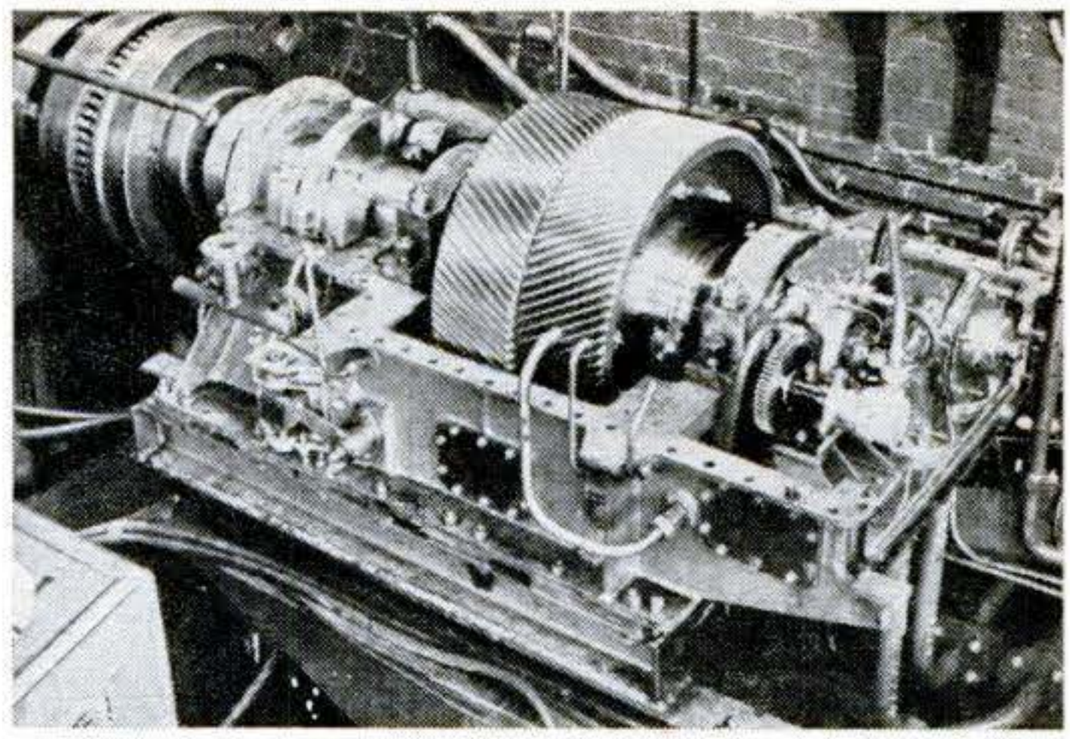
Finally, by employing the modified aircraft turbine, the Royal Navy got the jump on other marine engineers who have been working for several years to adapt the gas turbine for seagoing power. The U. S. Navy began a long-range experimental program more than three years ago. The U. S. Mari-



For all its bulk, shown by comparison with starboard reciprocating engine on its right, the turbine achieves a saving in pounds-per-horsepower. Geared independently to the 2009's center propeller, it remains idle except for full-power operation, when it matches the output of both piston engines together. In this view, the air intake is in the background.

Copyrighted material

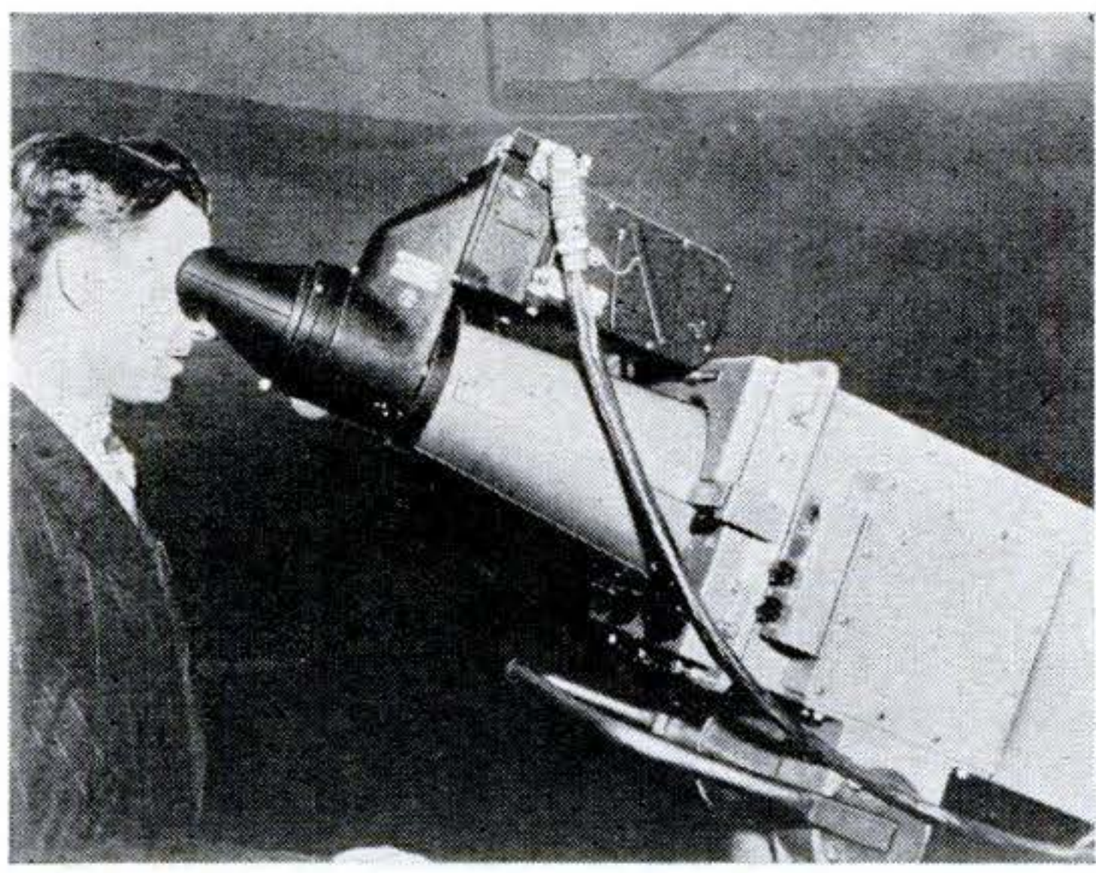


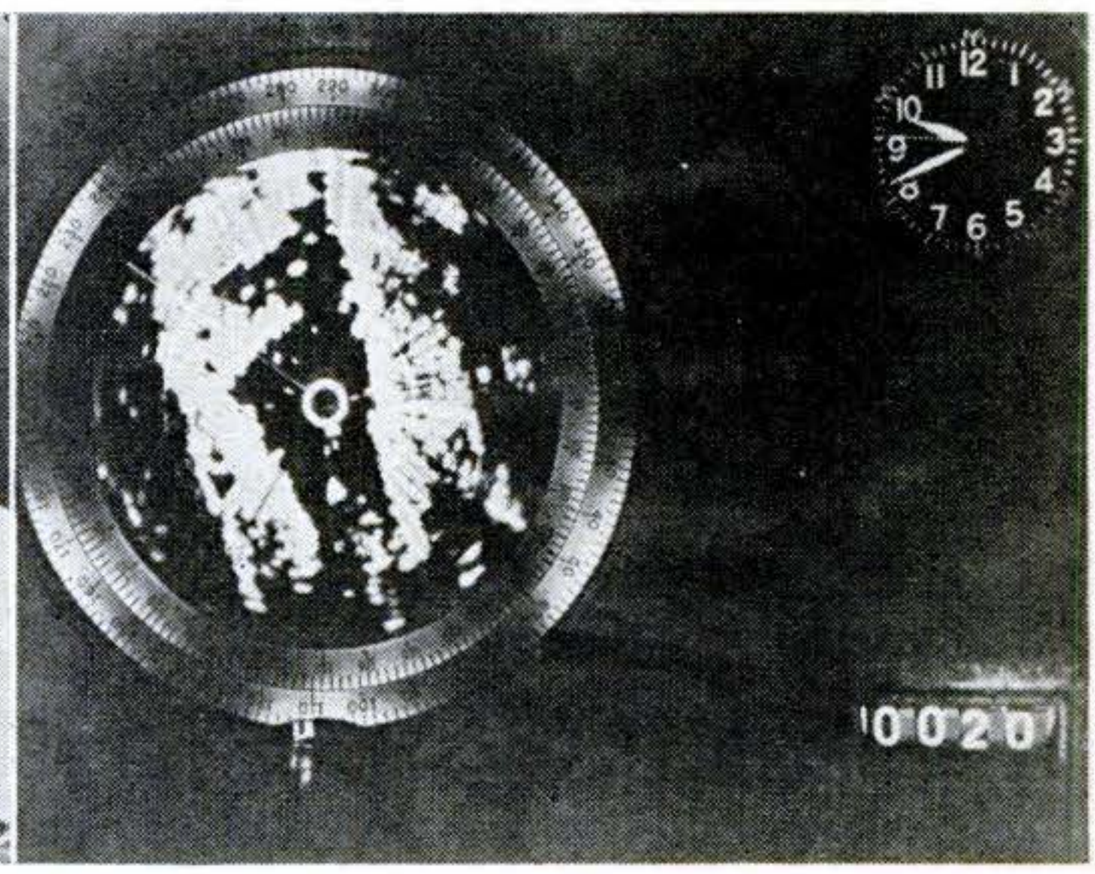


Reduction gears whittle turbine's speed, which tops 7,000 r.p.m. Turbine-driven pinion (above, left) at top of gear box transmits power to large main gear below it. Main gear, shown on right, turns the propeller. Self-synchronizing clutch links halves of double-helical main gear. Entire installation was designed by Metropolitan-Vickers, Ltd., of Manchester, Eng.

time Commission is fitting a Liberty-design cargo ship with a true marine gas turbine developed in 1945 by the Elliott Co., of Jeannette, Pa., but trials are still months away. In Britain, a 12,000-horsepower gas-turbine ferry is under construction.

With the 2009 already supplying experience in operation and control, the Admiralty is now planning larger gas turbines to power escort vessels. Designed from the start as marine units, they will be more efficient at sea than any converted aircraft version. But better turbines in bigger ships won't detract from the 2009's distinction: like Fulton's *Clermont*, she is a pioneer in a new field of power. END





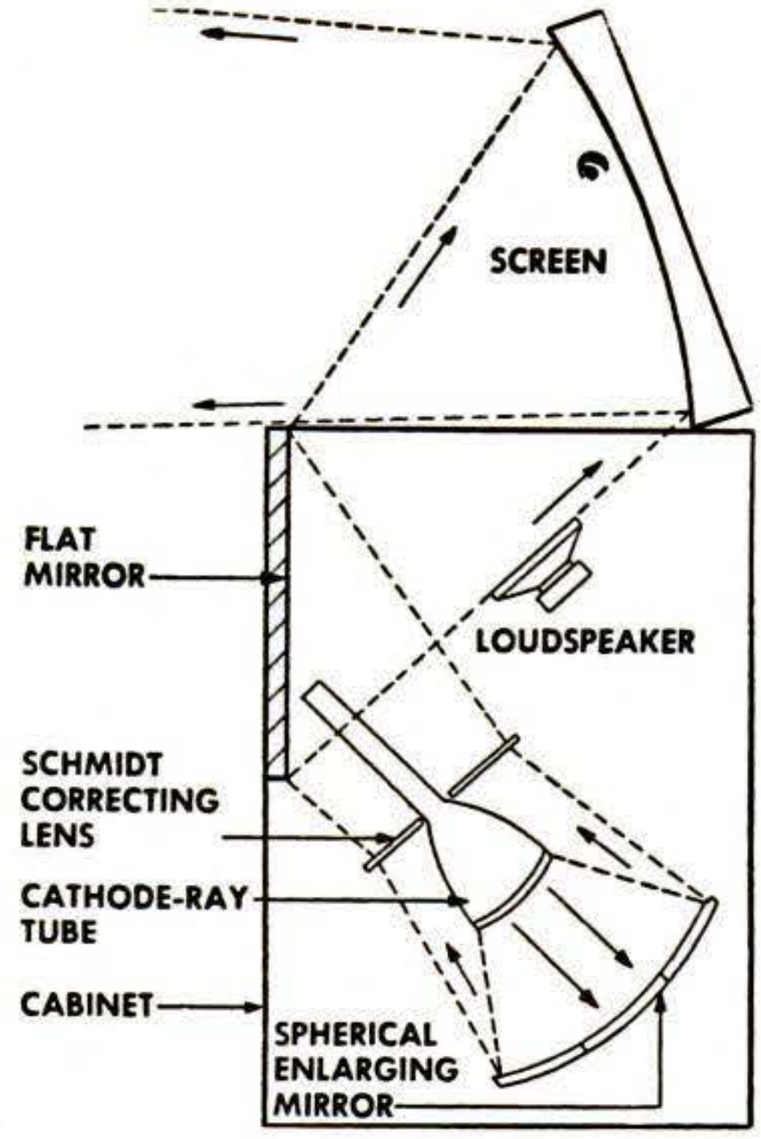
Making Radar Recollect

BESIDES telling a captain where his ship is in any kind of weather, radar can now tell him where it *was* at any moment of any trip. It can report today where and how fast the ship was going months or years before. In case of accident, it may even tell a maritime court who was to blame.

The trick of turning a flashing radar scope into a permanent record is done by the Fairchild Mirar (above, left), an automatic electric camera that can be set to snap pictures as often as conditions require—one every few minutes, or one for every flashing radar pulse. The camera uses 100-foot rolls of 35-mm. film with 1,600 exposures per roll, providing hours of recording even when the intervalometer, or timer, is set at a twice-a-minute rate.

The enlargement on the right shows how the camera gets its facts: besides the scope and its azimuth rings, which give the ship's course, each photo includes a clock face and a counter to identify it. With position and time known, speed can easily be computed from two or more pictures in sequence. Thus, when a roll is marked with dates and hours, it becomes a detailed, unalterable story of the vessel's performance.

Copyrighted material

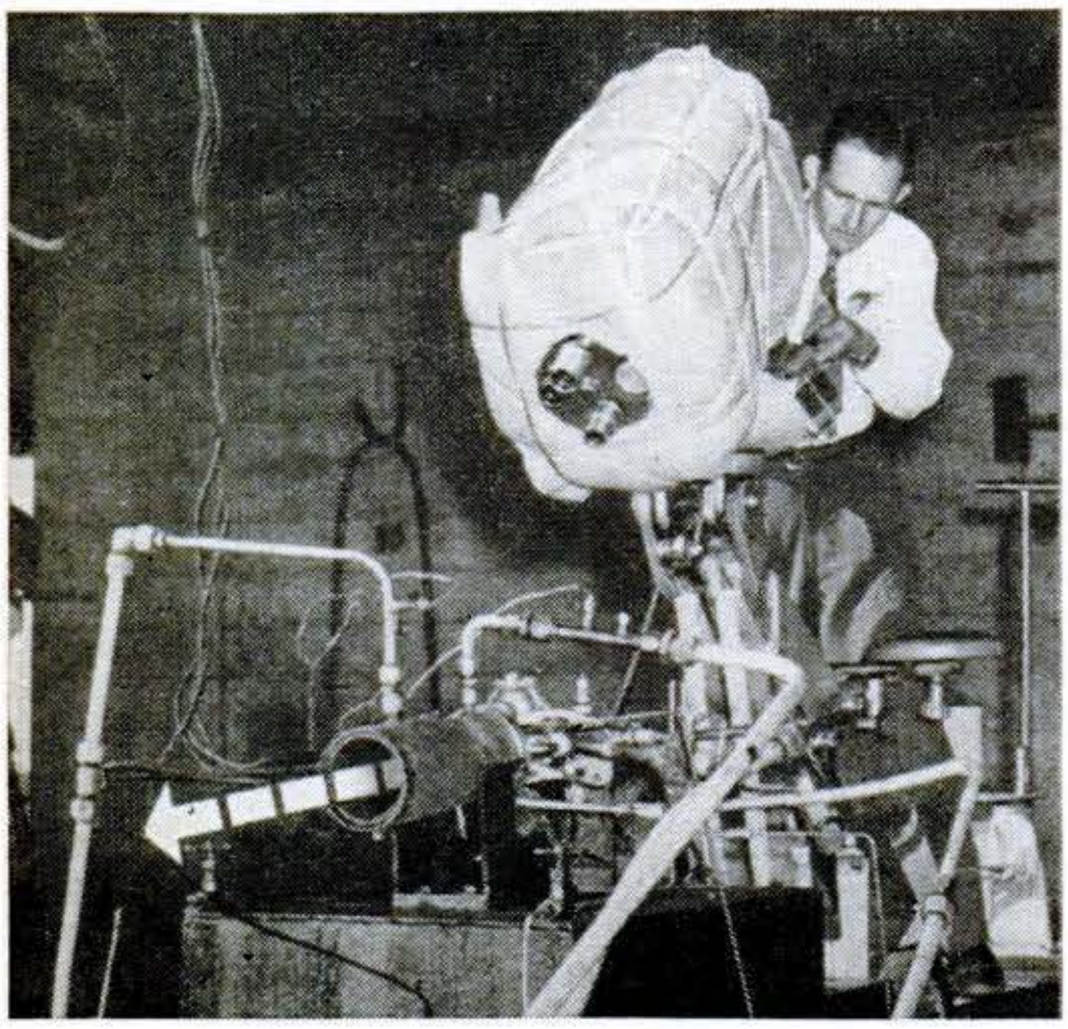


Tele Image Improved

EVEN with bright sunlight flooding the room, a sizable group can watch the 15- by 20-inch picture of the new Philco 2500 television receiver with perfect ease.

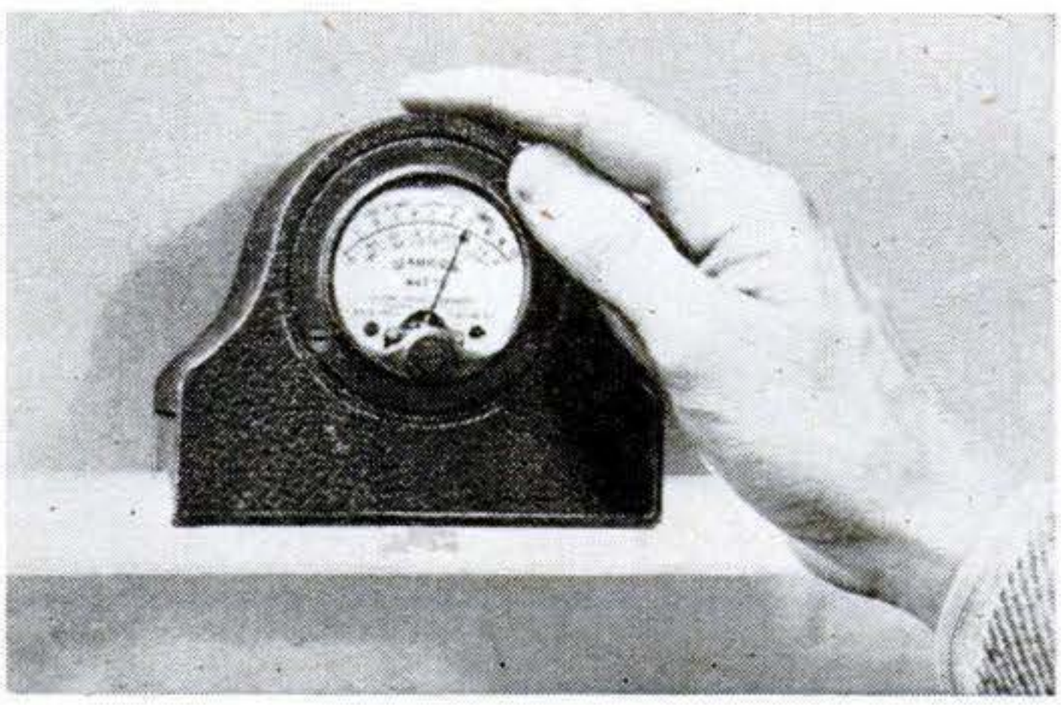
A spherical mirror (see schematic drawing above, right) enlarges the image as it reflects it through the Schmidt lens (which removes distortion) to the flat mirror and then to the concave metal viewing screen.

Vertical grooves in the screen brighten the image by concentrating most of the light into a beam that is fairly wide horizontally but narrow vertically. The usual dark spot in the center (caused by the tube blocking part of the image reflected back by the spherical mirror) is eliminated by spraying the screen with a clear lacquer that forms millions of tiny, lenslike droplets. These bend the light back to the center, giving an over-all brilliant image.



Rocket Tests Televised

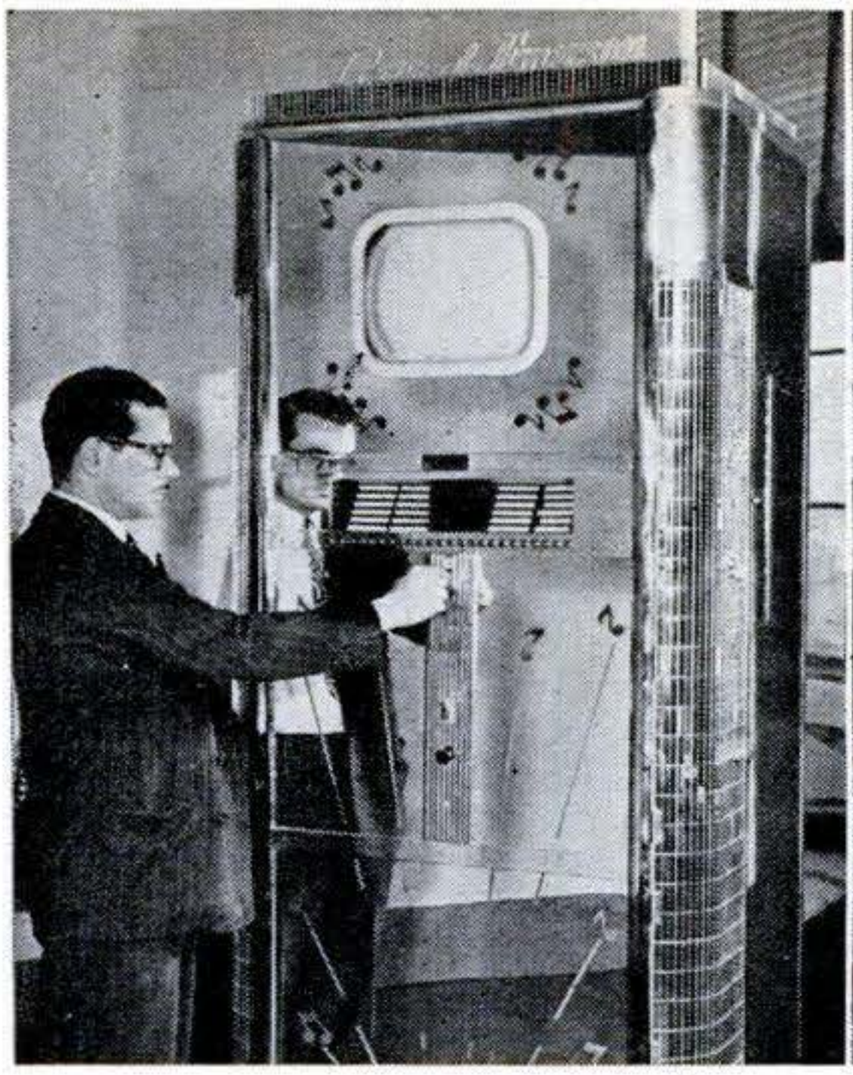
SWATHED in rubber to reduce vibration, a GE television camera is trained on the exhaust (arrow) of a high-thrust rocket motor. Scientists at Azusa, Calif., can thus observe the dangerous firing of the experimental rocket on tele screen 700 feet away.

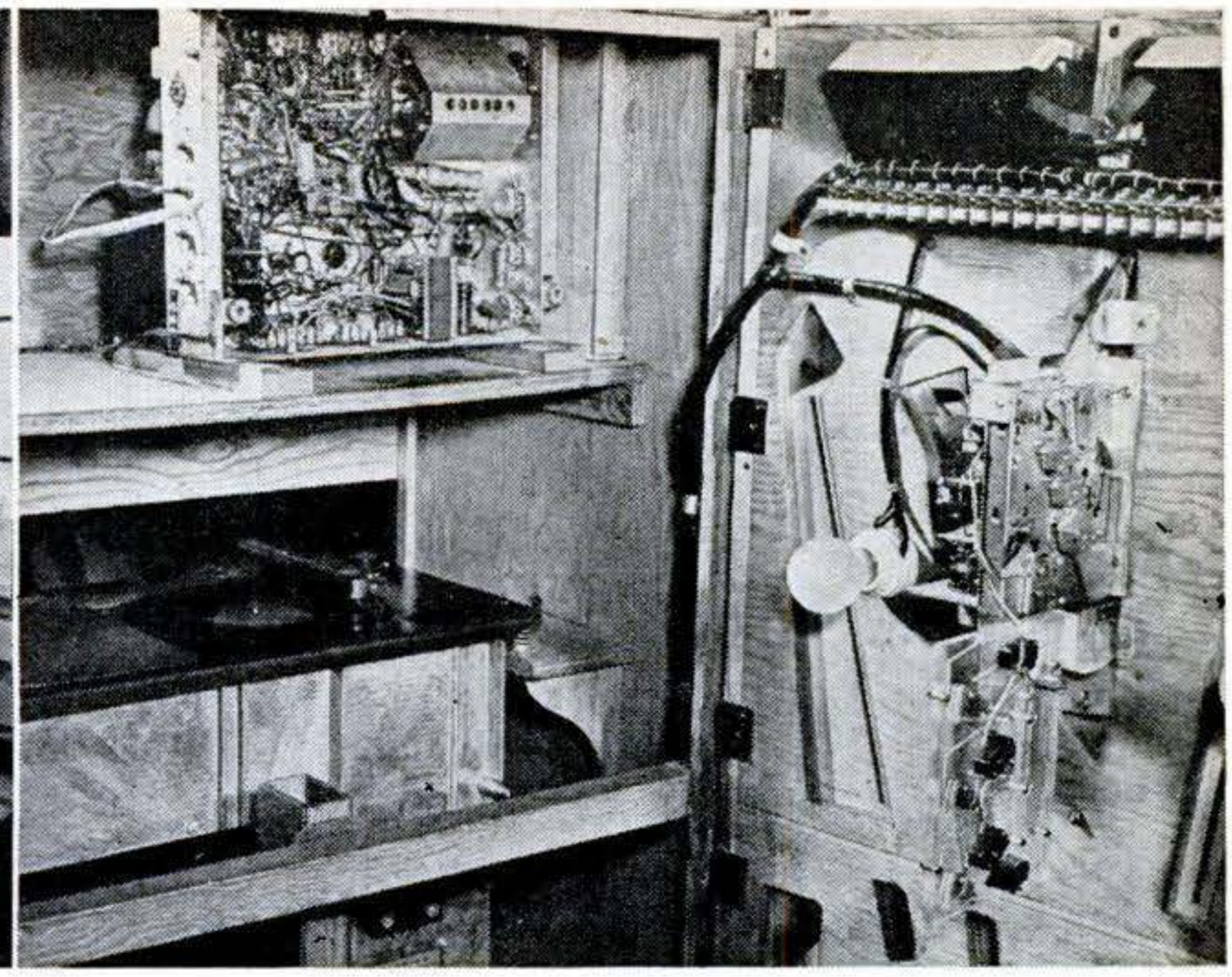


For Germ-Killing Lamps

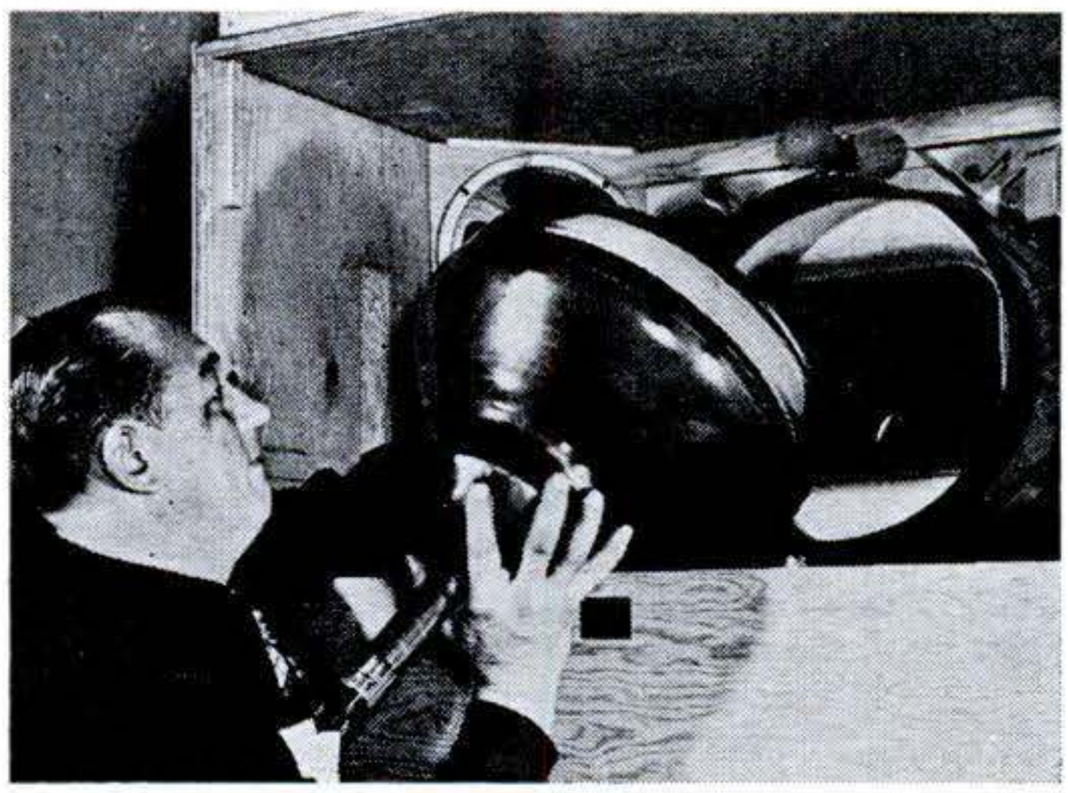
A GERMICIDAL lamp is swell for slaying bacteria in the air, but only if its lethal energy is up to par. Here's a new GE Wattmeter which, when placed in contact with a lamp as shown above, gives a direct reading of its germ-killing energy output. It is one of three such new meters put out by GE. Another measures the amount of germicidal energy reflected by walls and ceilings; the third measures the intensity of germicidal ultraviolet rays anywhere in a room.

Copyrighted material





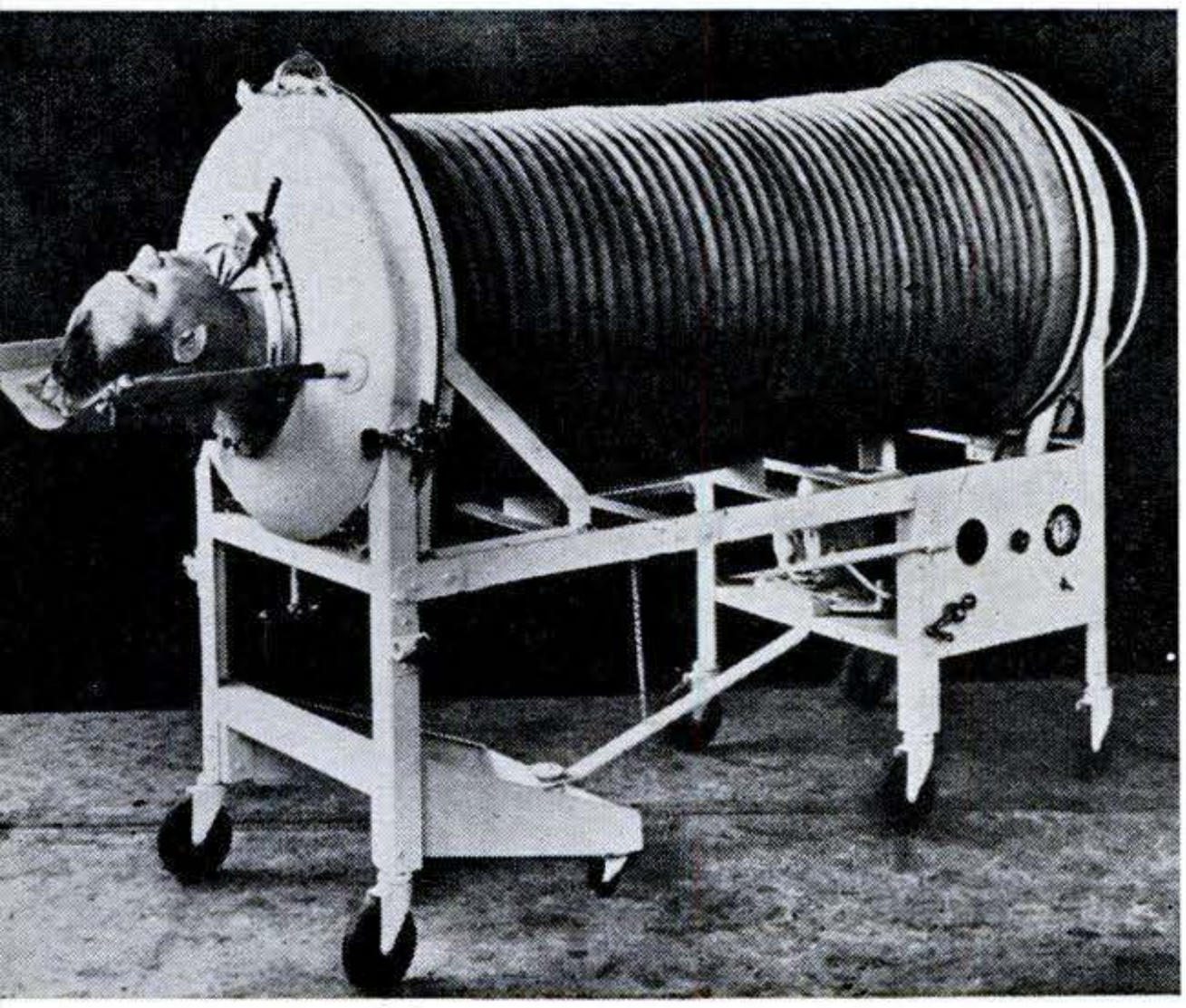
A nickel goes into the slot of a new television juke box, above, left. Screen is at top center. Picture above, right, shows how front opens for easy servicing. Phonograph turntable is at lower left, with television receiver directly above. Coin mechanism is on back of the door.



The big television viewing tube is replaced readily from the rear. Edge of one of the two speakers is partially visible above the tube.

Juke Box Gets New Look

A NICKEL in the slot will buy you one televised prize-fight round if the neighborhood tavern is hep to the latest thing in juke boxes. This is a chrome-and-mirror-bedecked coin phonograph, made by the Videograph Corp., of New York, with a 12-inch television screen added. You can choose your own records in the usual way, but the manager decides whether your five cents will buy a three-minute glimpse of television. And since he operates the controls, he also picks the program. If jive, wrestling, and boxing fans are gathered in one place, he'd better be a Solomon.

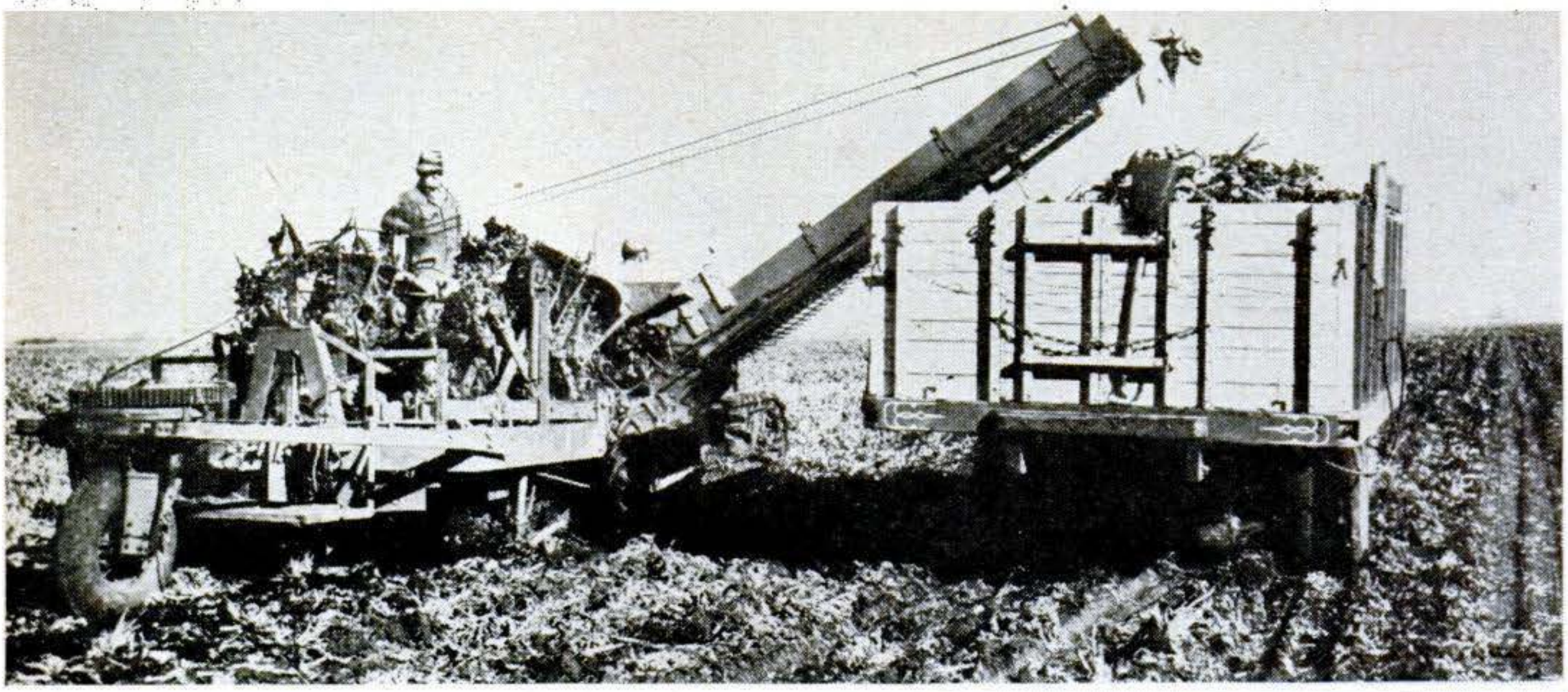


Rubber Lung Folds Up

ONE drawback of the iron lung for emergency use is its great bulk and weight. Now the U. S. Rubber Co. and the Iron Lung Co. of America have come up with the lightweight, portable rubber lung shown at the left. A large accordionlike rubber bellows contains the patient, replacing the heavy steel tank of the iron lung. An electric pump forces air in and out of the chamber, enabling the patient to breathe.

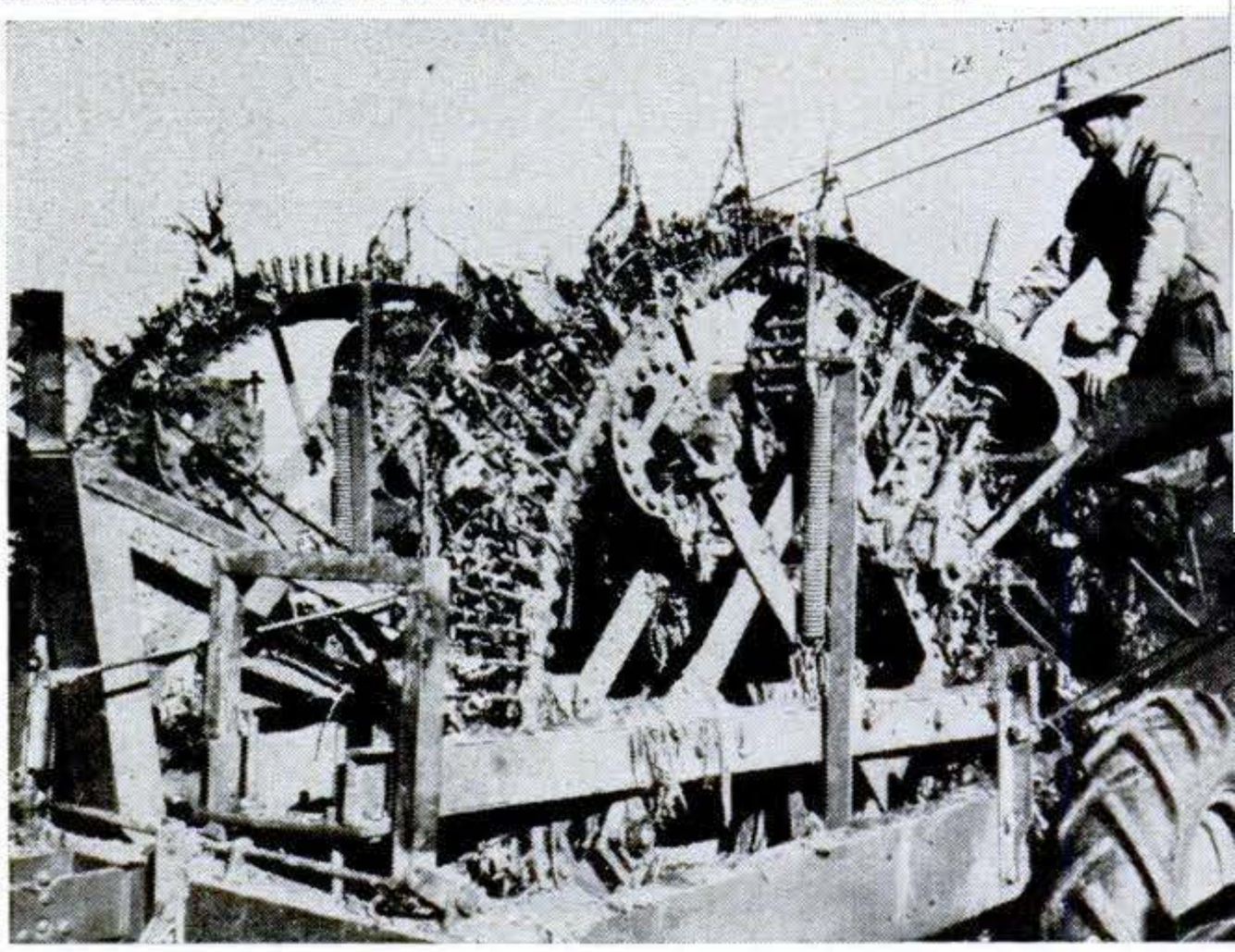
When not in use the rubber bellows, which is reinforced by steel rings, folds up, as does the hinged base. Not intended as a substitute for the iron lung, the new respirator's principal feature is that it can be carried easily to the scene of an accident in a truck, ambulance, or plane.

Copyrighted material



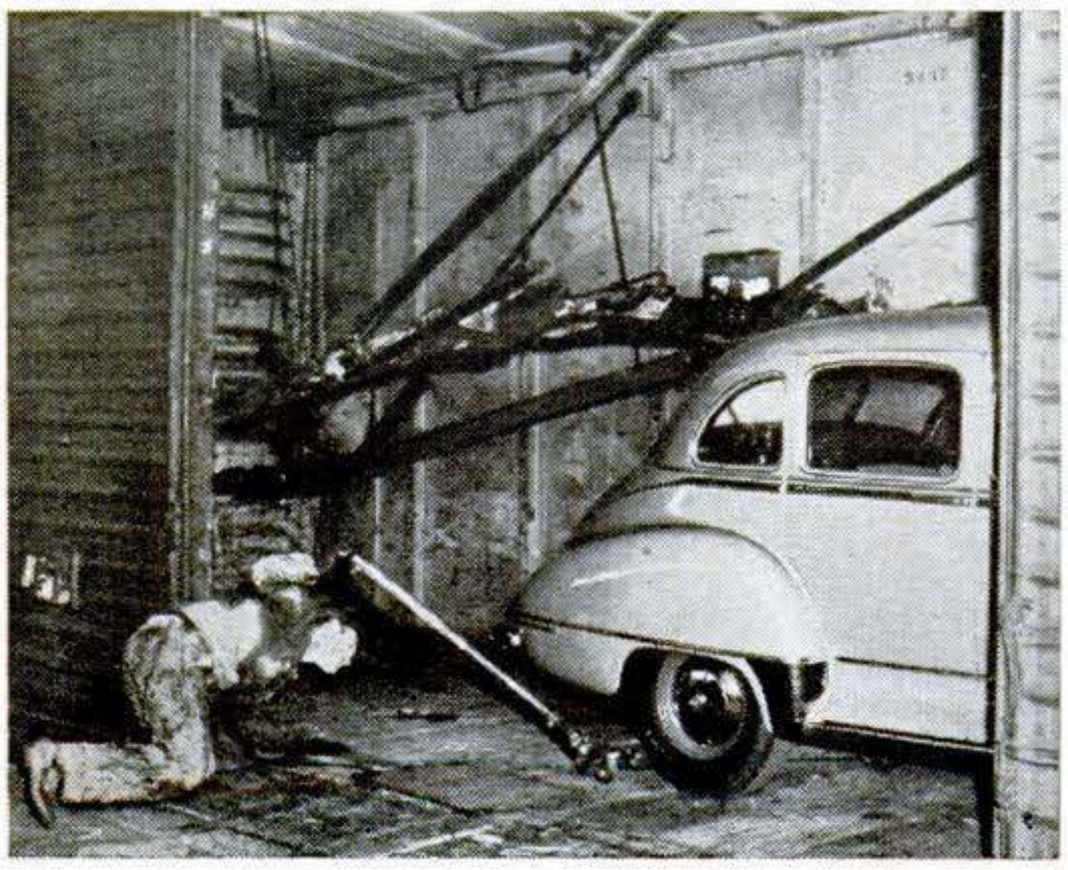
Better Beet Harvester

THE backbreaking job of pulling sugar beets has been taken over by a machine that does the work of 20 men. As the "harvall" moves down a row, plowlike lifters loosen the beets in the ground. Next come six-foot pronged wheels (right) that impale the individual beets. These are brought around to a point where a mechanism powered by the motor lifts the beets on the prongs to just the right height for cutting disks to slice off the top (crown and leaves) with a minimum of waste. The cropped beets go into a conveyer that dumps them into an accompanying truck. The machine is made by the Sterling Mfg. Co., of Minneapolis.

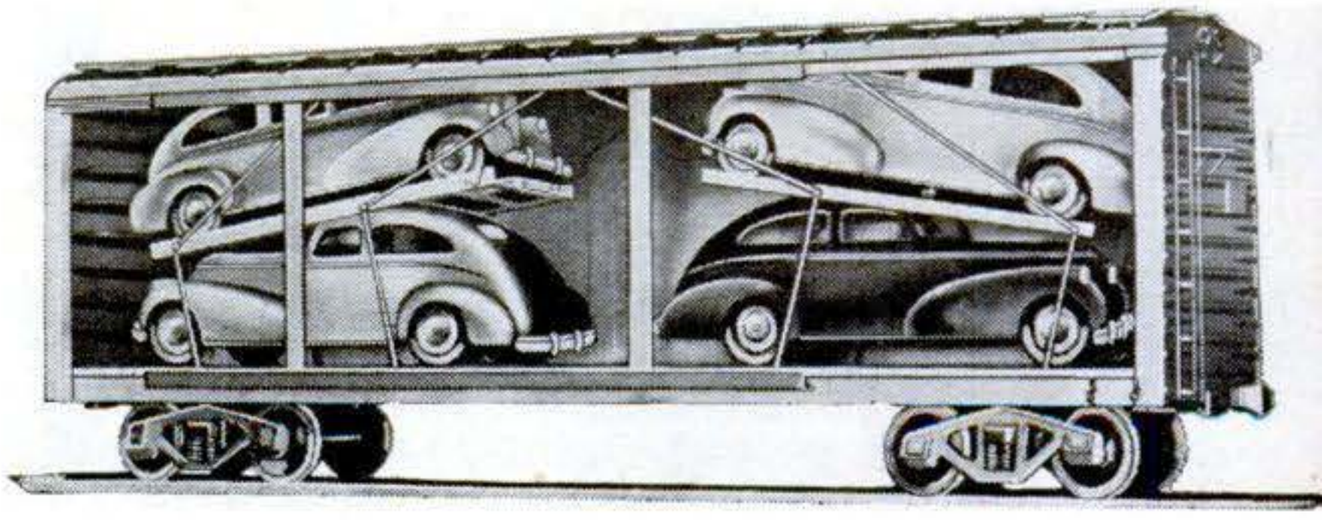


Autos Ride Piggy-Back

THE capacity of automobile freight cars is doubled by the use of a new loading rack, shown below. It stacks two autos in the formerly dead space at the top of the car.



For loading, the first automobile is rolled into the freight car and onto a lowered rack, which is then raised by an electric motor lift. A second rack at the other end is similarly loaded. Next the two floor autos are rolled into place, and the supporting legs of the racks let down and anchored. At destination, unloading takes four men 20 minutes. Made by the Evans Products Co., of Detroit, the system is used on all Atchison, Topeka and Santa Fe automobile freight cars.



Copyrighted material

New Giant Trailers Plow Through Deepest Desert Sand

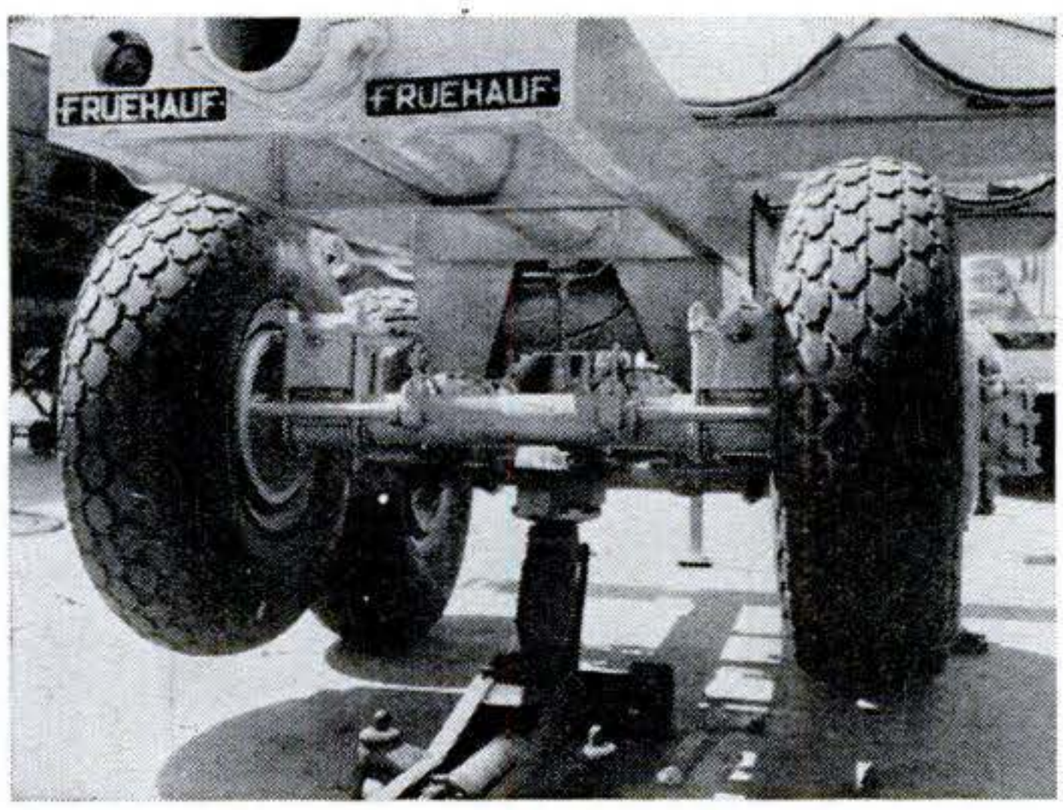
Desert maneuver for a load of 120-ft. pipe, weighing 36 tons. At rear is eight-wheel dolly.

MOTORIZED ships of the desert, trailers and trucks as sandworthy as camels, will haul pipe and supplies during construction of a new 1,050-mile oil line across an Arabian desert.

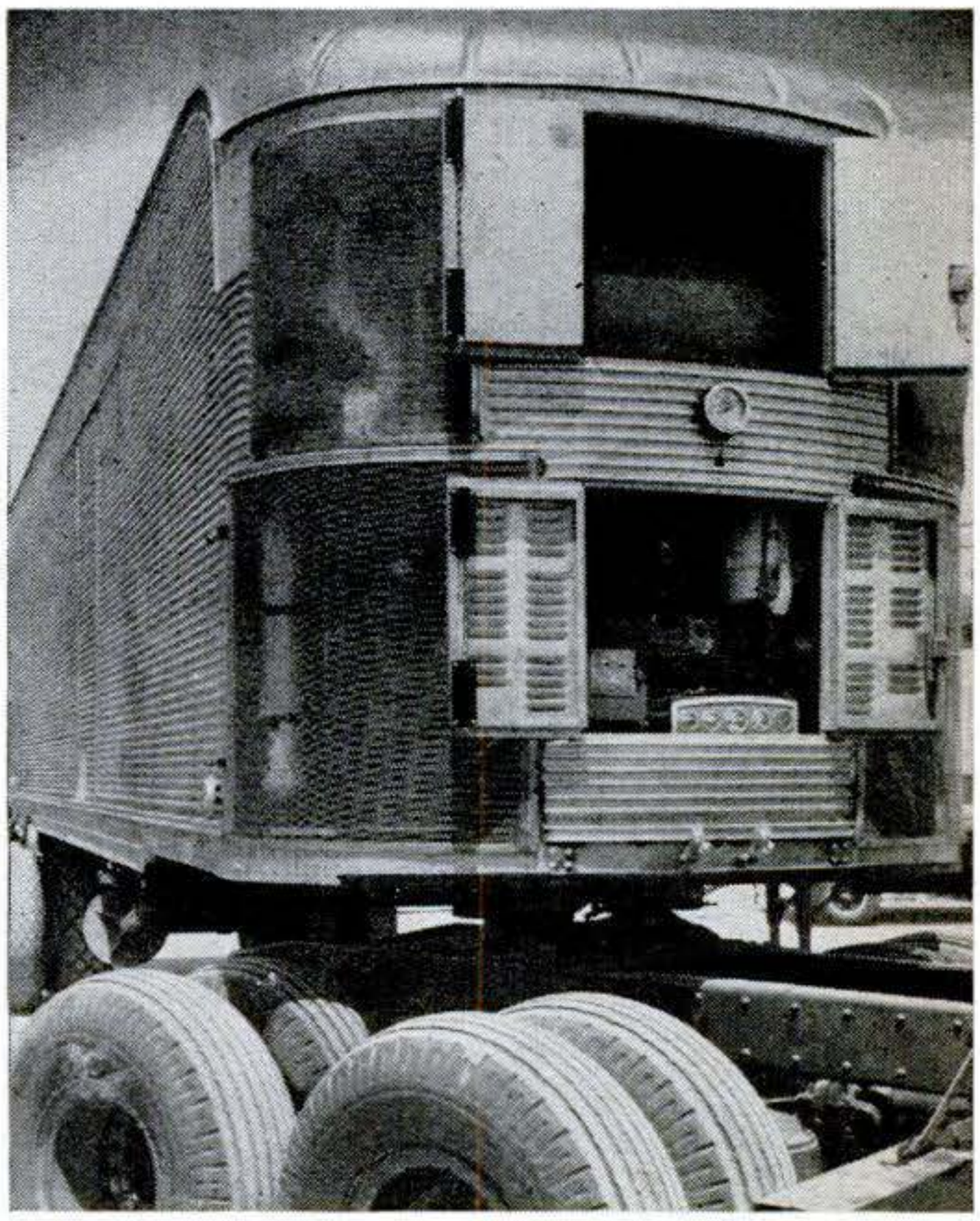
More than 300 units of trailer equipment, from eight-wheel, dual-axle pipe dollies to 3,500-gallon water tankers, were built for the purpose by the Fruehauf Trailer Co., of Los Angeles. Guinea pigs from among them were selected for "flotation," or buoyancy, tests among the sand dunes of the Arizona desert near Yuma. For the heavier loads of 36 tons or more, the big tires, as large as 14.00 by 20, were inflated to only 10 lb.; under other conditions, tire pressures were increased up to 25 lb.

The new pipe line, which will carry oil from the interior of Saudi Arabia to the Persian Gulf, is a $125,000,000 joint project of the Standard Oil Company of California and the Texas Oil Company.

Buoyancy of tires in deep sand is tested under varied conditions. Here tire pressure of 20 pounds easily handles a 32-ton load; other units will have to haul loads up to 100,000 pounds.



Rubber-mounted springs and fulcrum permit each of these massive tires to rise 18 inches above level and still maintain traction while rolling over rocks and other ground obstacles.



Refrigerator trailers like the one above are built of stainless steel to resist corrosion and reflect desert heat. Carrying 18 tons of food, they will supply the camps along the pipe line.

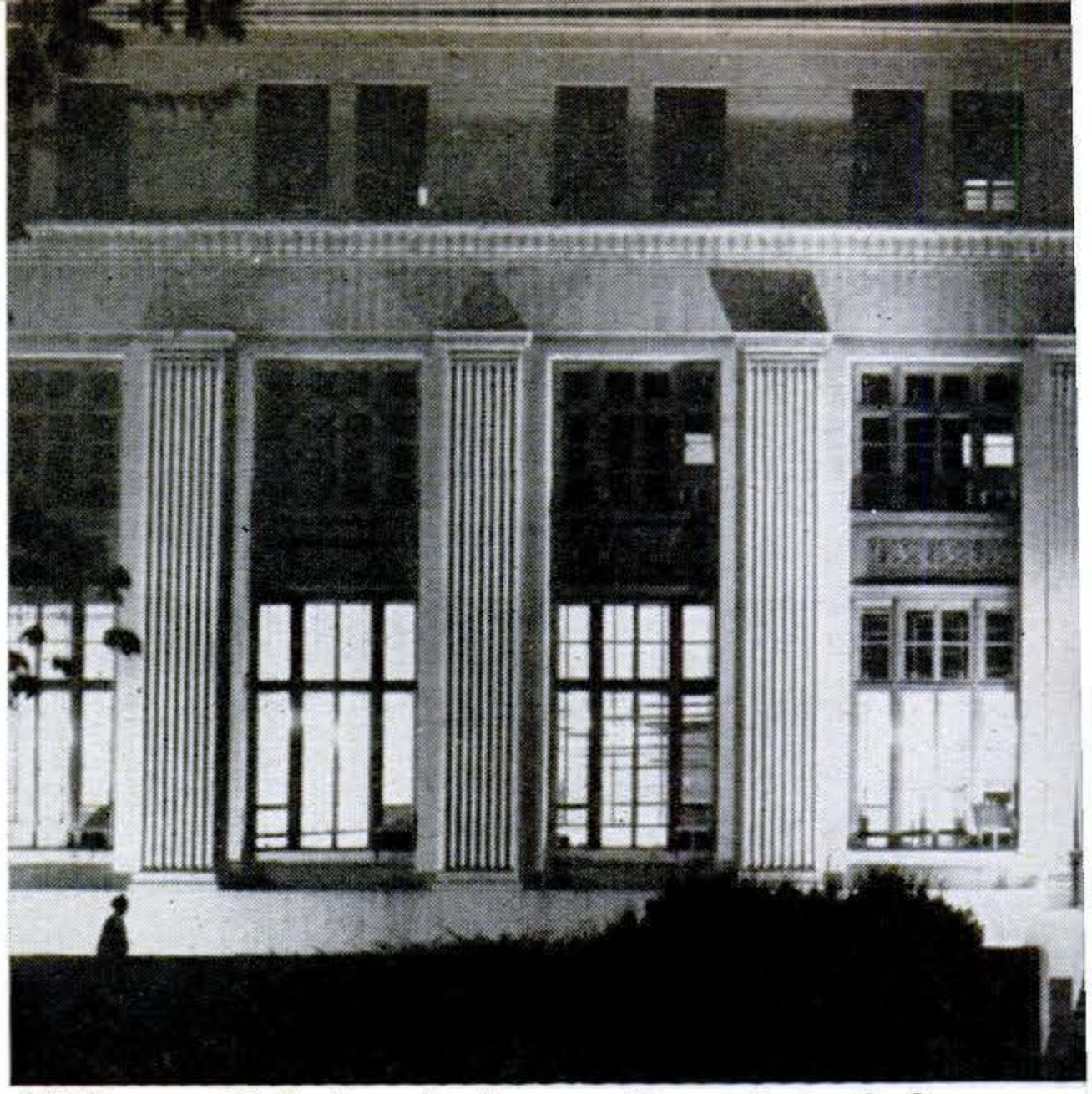
Copyrighted material

Don't Try to Crash This Gate!

Wall of security surrounds operation of Atomic Energy Commission.

By Frank Carey

Associated Press Science Writer

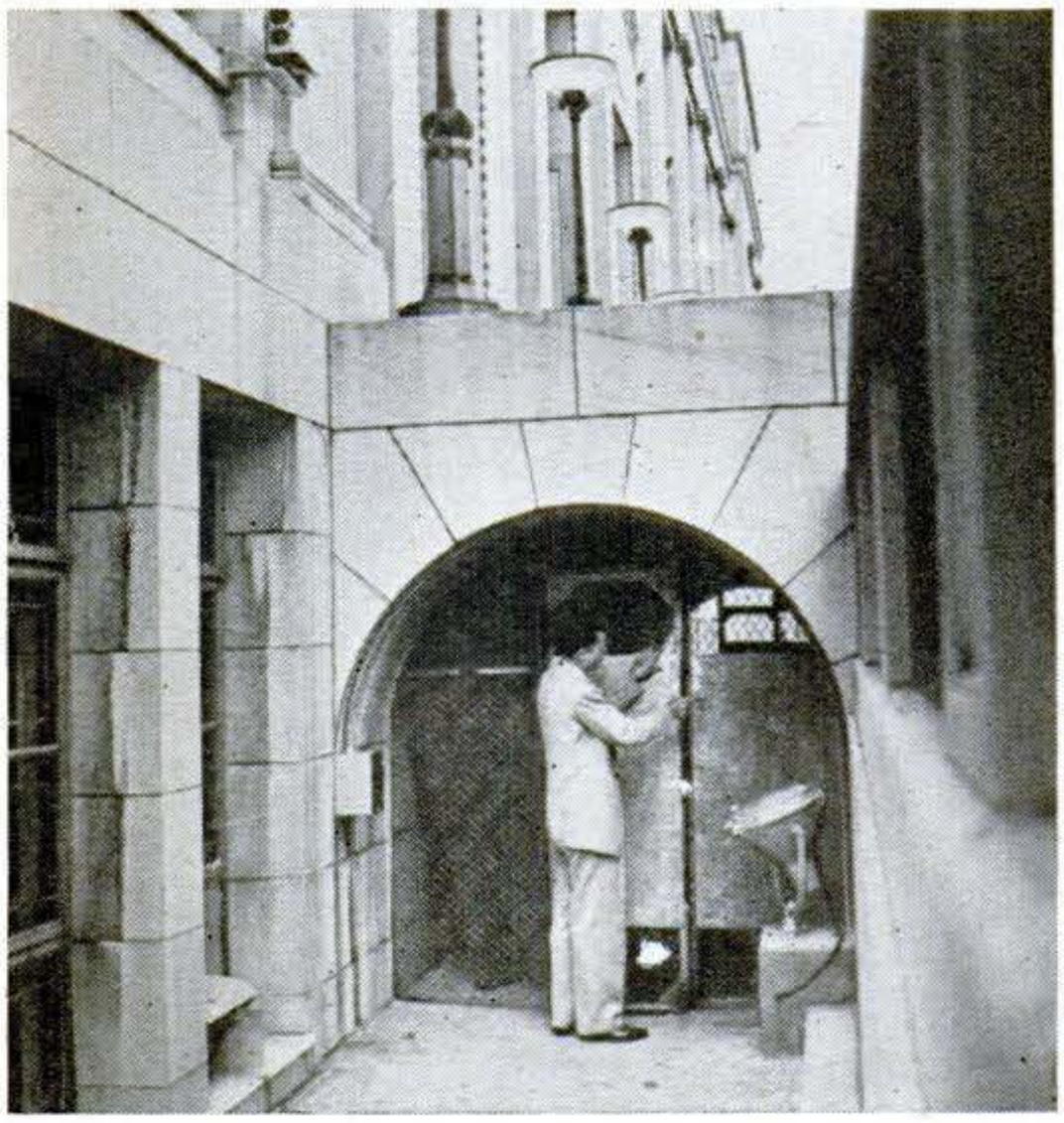


All lit up: U. S. Atomic Energy Commission's

ONE of the most beautiful nighttime sights in Washington is the U. S. Atomic Energy Commission's headquarters on Constitution Avenue. It's all lit up like a Hollywood theater—but for reasons of grim security, not display. This is protective lighting, designed to expose anyone who tries to break into the key building in the nation's atomic energy program.

A strong-arm force of 100 guards, trained in judo tactics and marksmanship, and a network of electronic devices and physical barriers make the building a bastion of security. And as the building itself is guarded, so are the secrets inside—from formulas to scientists' doodlings.

Less obvious than the floodlights, but constantly alert, are the electric "eyes" spotted all over the outside and on top of the building. According to security officials, anything "heavier than birds, hailstones, or leaves" will activate the eyes and flash a



Grating being inspected above closes off possible hiding places where "dry moat" surrounding the building runs under stairways. One of the floodlights is seen at lower right.

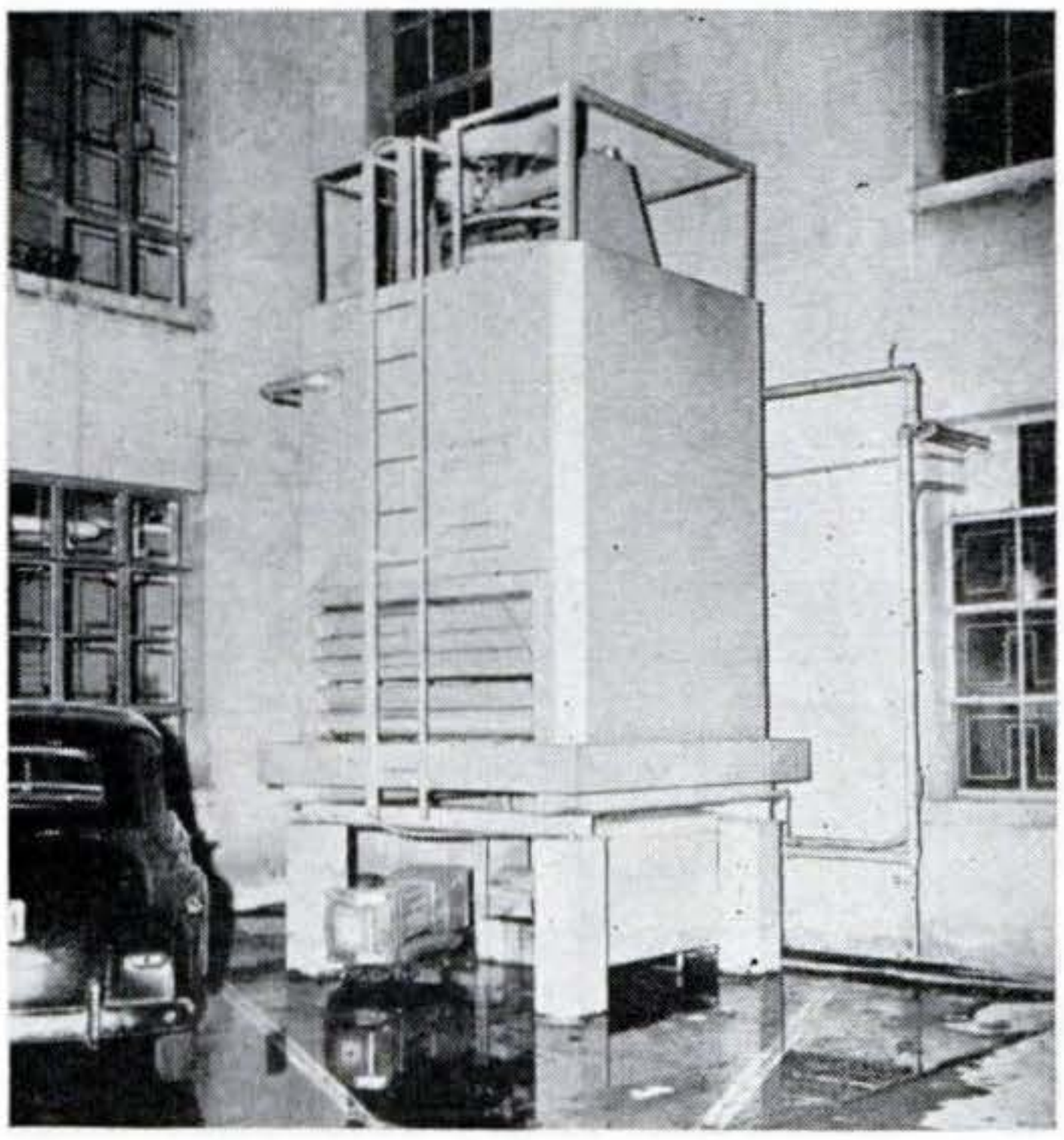
Aluminum sheathing covers the wire mesh enclosures around the lower part of fire escapes. This is to foil any intruder who might try to gain entry by wearing spiked shoes.

Copyrighted material

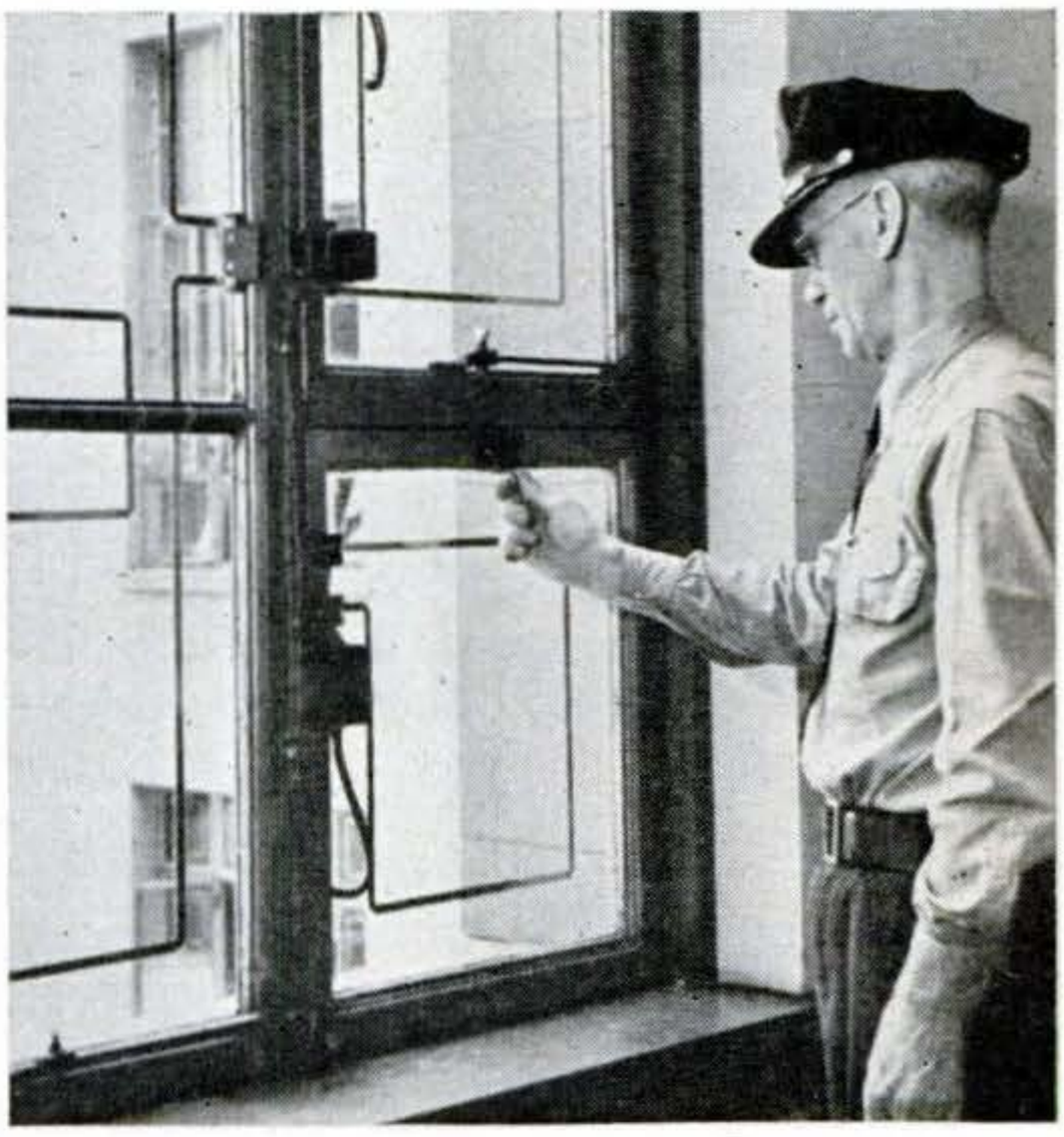
Washington, D. C., headquarters are brilliantly night-lighted to reveal possible prowlers.

signal on a centrally located enunciator board. Any tampering with the electrically protected windows will flash a similar alarm. In case of a break, it is estimated that guards could reach the farthest corner of the building's attic in less than two minutes.

Even if you are an employee of AEC, and want to get into the building at night on official business, you find it no cinch. You show your identification pass to a guard on the other side of the glass panel of a door that is locked and hooked up with an electrical alarm system. You're okay, but the door guard, a cautious soul, looks at a semicircular mirror that gives him a six-angle view of the areas outside. If he doesn't spy a gang of potential enemy agents lurking offside, he signals another guard who momentarily switches off the alarm system so that the door can be opened. And then you finally enter, to be faced by a couple of stalwarts ready to draw guns from their

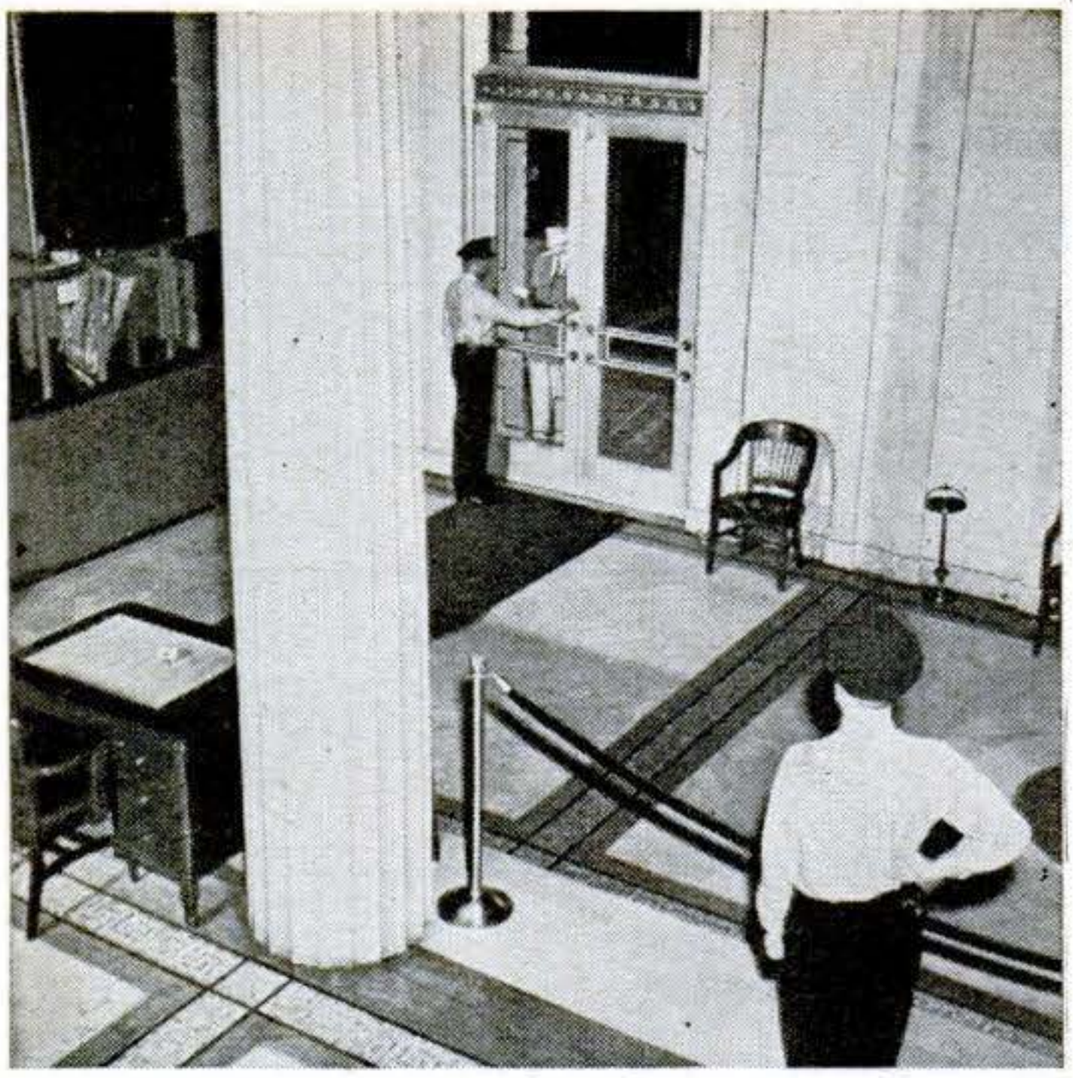


Air conditioners, linked with outside units like the one shown here, not only have electrical protection against prowlers, but contain filters designed to keep out poison gas.



Protective tape, carrying an electric current, lines every window accessible from the ground. Any tampering from the outside flashes a signal giving exact location of attempted break.

Copyrighted material



Night visitor shows identification at door. If he is okay, guard at far left will switch off door alarm system. As an added precaution, the guard in foreground is ready to draw his gun.

Both employees and visitors must check in at the reception desk to receive their badges. All visitors, except those on "preferred" list, must have an escort going to and from offices.

hip holsters—just in case you try anything.

When Bryan F. La Plante, a veteran of Army counterintelligence, took charge of the security system, he decided to start at the bottom. Right off he found that a man could gain entrance to AEC high-command offices by crawling through a heat tunnel linking the building with a central heating plant. When health authorities reported that a man could live in the tunnel for almost half an hour despite the heat radiating from the pipes, a concrete wall was built around the pipes.

Next La Plante recommended that seven of the nine entrances to the building be locked at all times, leaving only a single front and rear entrance open. The barred doors can be opened only from the inside by a five-door-type crash bar.

Now for legitimate entry into the building. Based on the system used at wartime installations of the Army's Manhattan District—makers of the A-bomb—regular employees have to exchange passes for badges at the reception desk. Both have a photograph of the "cleared" person, and these are carefully checked before a person receives his identification badge, which must be worn at all times within the building. When leaving the building, the employee turns in his badge and gets his pass back. As an extra precaution, the color scheme of all badges and passes is changed periodically.

Visitors must have an escort while going between offices and the reception desk, and even if they go out for a drink of water from a corridor bubbler. Exceptions are certain "preferred" list visitors. These include cabinet officers, congressmen, and scientists who have frequent business with the commission or its staff. They receive a special identification badge, but only after a thorough security investigation. And everyone, including David E. Lilienthal, Chairman of the Atomic Energy Commission, must "log in" at the reception desk. Only such clearance is the "open SESAME" to AEC's inner sanctums.

But even with everyone in the building checked and double-checked, the security staff doesn't relax its vigilance. Persons walking along corridors are frequently challenged and the photograph on their badges compared with the original. The prankster who pasted a picture of Hitler over his own identification photo and gained entry to a government building during the war, would soon get the bum's rush at AEC.

Some of our top scientists are doodlers from way back. So, after a pow-wow in one of the conference rooms—soundproofed against eavesdroppers—pads that have been used for making notes are carefully inspected. The security boys remove not only the sheets that have doodles or notes that may be of the slightest use to prying eyes, but also all sheets that have the slightest impression of a pencil mark.

Guards check every safe once an hour all through the night. If one is found open, the person responsible, whose name and

Copyrighted material

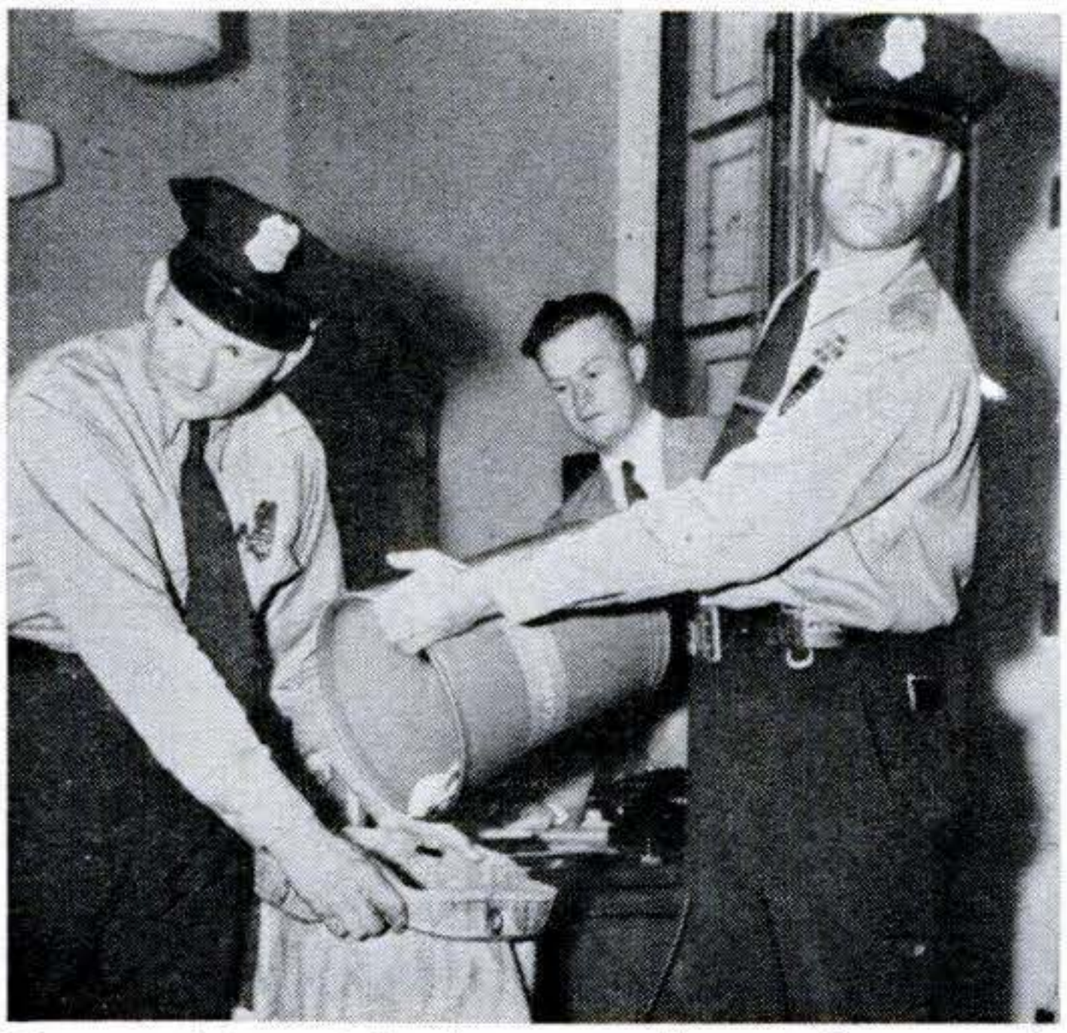
Badges of employees are placed in guarded racks when they leave, must be worn at all times while in the building. If anyone attempts to tamper with these badges, a "bleeding ink" flows and smears the surface. Bottom row of rack above holds badges of the atomic energy commissioners, with the one of Chairman David E. Lilienthal at the far right.

telephone number is pasted inside, gets a call. No matter what time of the night, he is told to hot foot it down and check the contents in case something is missing. And in the morning the culprit is on the carpet.

And although the building is fireproof, safes are so constructed that in case of a fire, they could crash through two floors without cracking open, holding their secrets intact.

Nothing "confidential" or higher is discussed over the telephone. And anyone succeeding in tapping a phone line is likely to hear a conversation interspersed with code words in a sort of glorified double-talk. Information is departmentalized—that is, employees are allowed to know all that is necessary for their particular job, but NO more.

This, of course, isn't a complete blueprint of the safeguards surrounding our atomic energy program. For, as La Plante says, "There's much more to maintaining security, but we can't tell all our trade secrets." END



No peeking. That's a regulation for guards dumping wastebaskets containing confidential and secret material that is to be destroyed. These special baskets are painted a vivid red.

This incinerator keeps its secrets well. The scraps of paper are burned to a powdery ash. Shoveled into trash cans, the ashes are then watered down to prevent spreading.

Copyrighted material

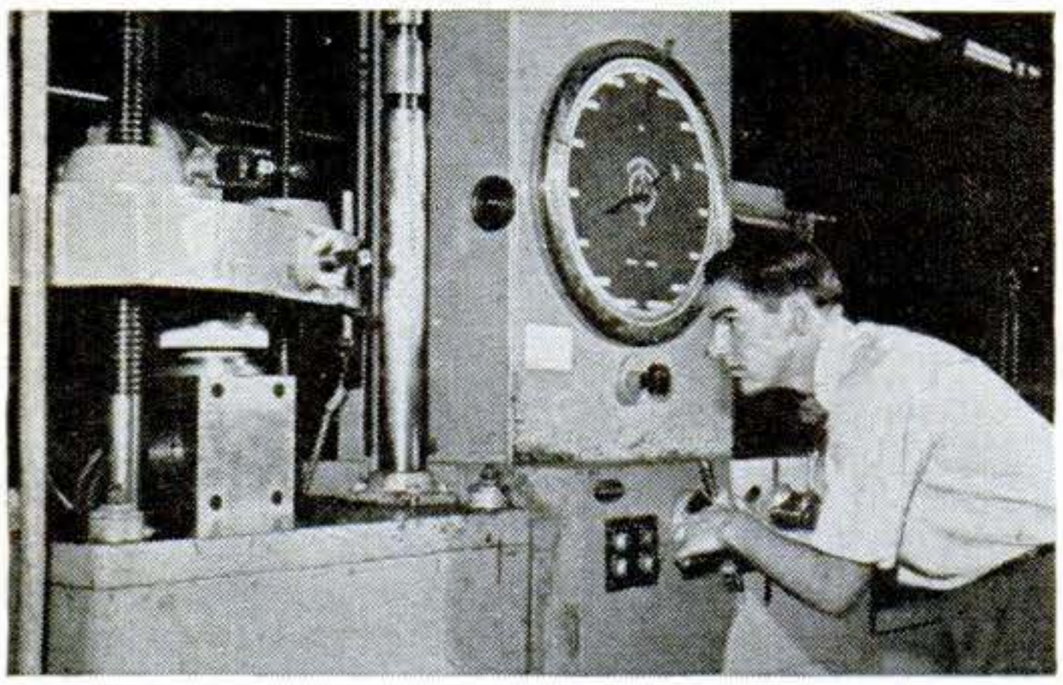
Freeze Treatment Hardens Soft Metal

Soft metal gets tough under a spray of liquid nitrogen that freezes it to 320° below zero.

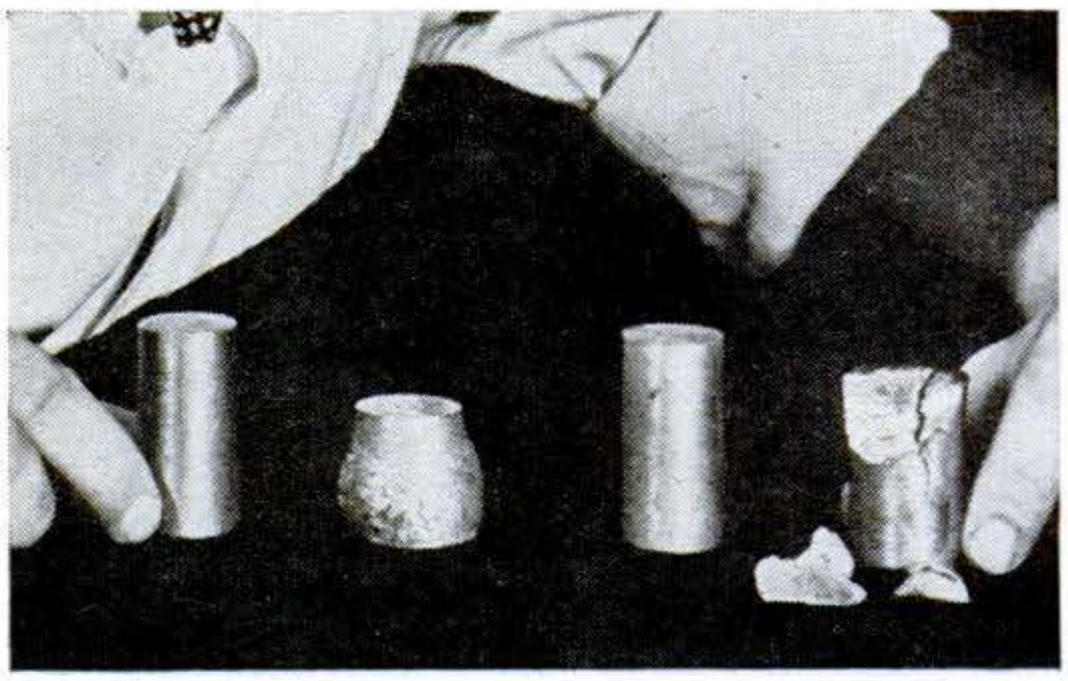
A METAL so soft that it melts in hot water can now be made to stand up under the tremendous pressures put on dies. A brief spraying of liquid nitrogen, one of the coldest substances known, does the job. In a few minutes, the soft metal, cerrobend, freezes and changes from a consistency like dried putty to the hardness of brass—and stays that way until it warms up again.

The treated metal, an alloy of bismuth, tin, and lead, was developed by Ford Motor Co. engineers for use as die material in making parts. Formerly it took six weeks or more to make steel dies. With the soft metal, dies can be made in a day or two.

Engineer arranges treated cerrobend dies in a press that will produce experimental metal stampings. From six to 10 stampings can be made between liquid nitrogen baths.



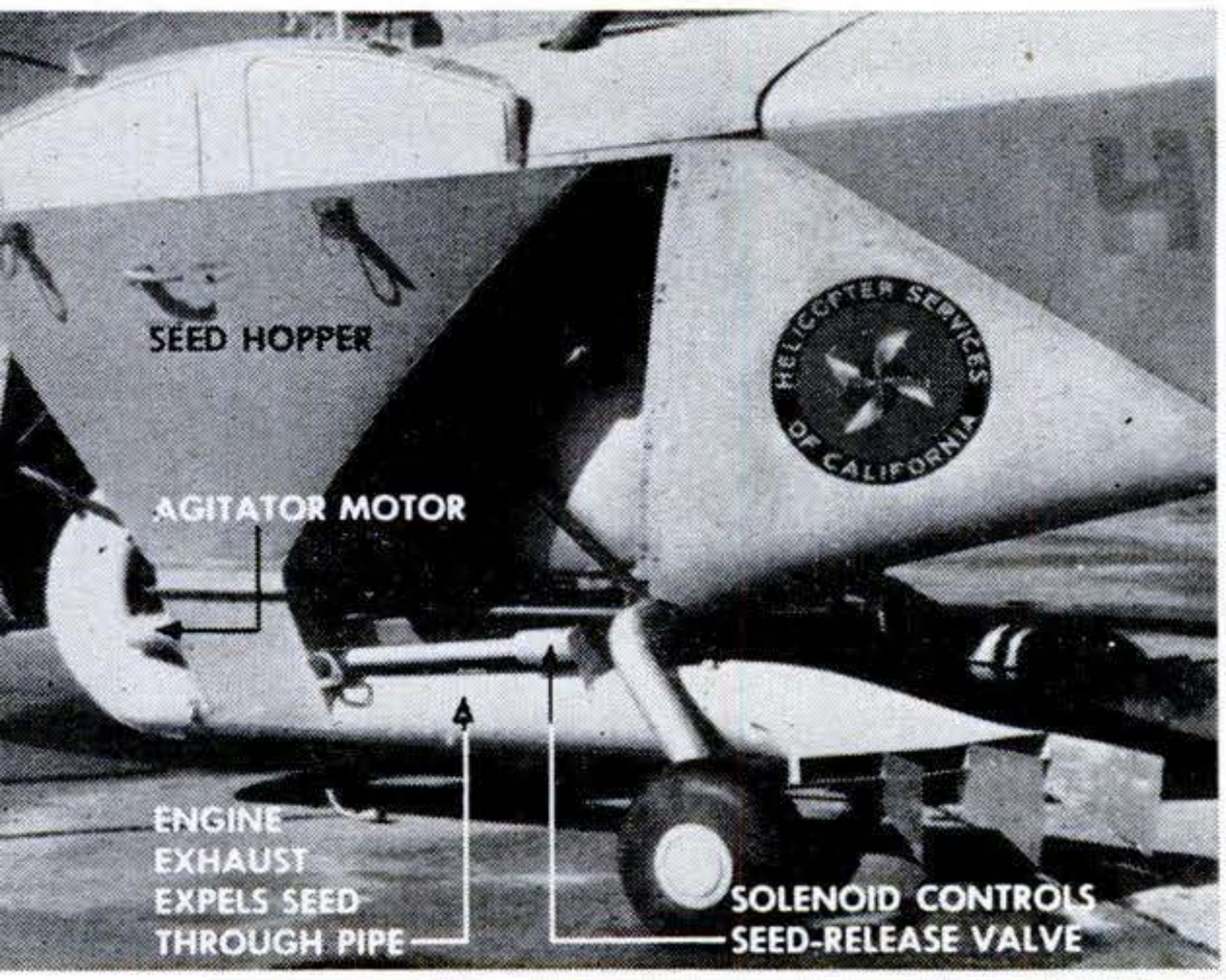
Load-testing mechanism is carefully lowered on the experimental dies. Although originally putty-soft, the metal is now hard enough to withstand a load of 10,000 pounds.



When nitrogen-chilled pig of the metal, far left, is subjected to a load of 5,650 pounds, it just bulges out. At far right is shown what happens to untreated metal under same pressure.

Copyrighted material

A seed-sowing helicopter spreads mustard over burned-out Los Angeles watershed to cover soil and forestall erosion. U. S. Forest Service photo below shows details of the sowing unit.

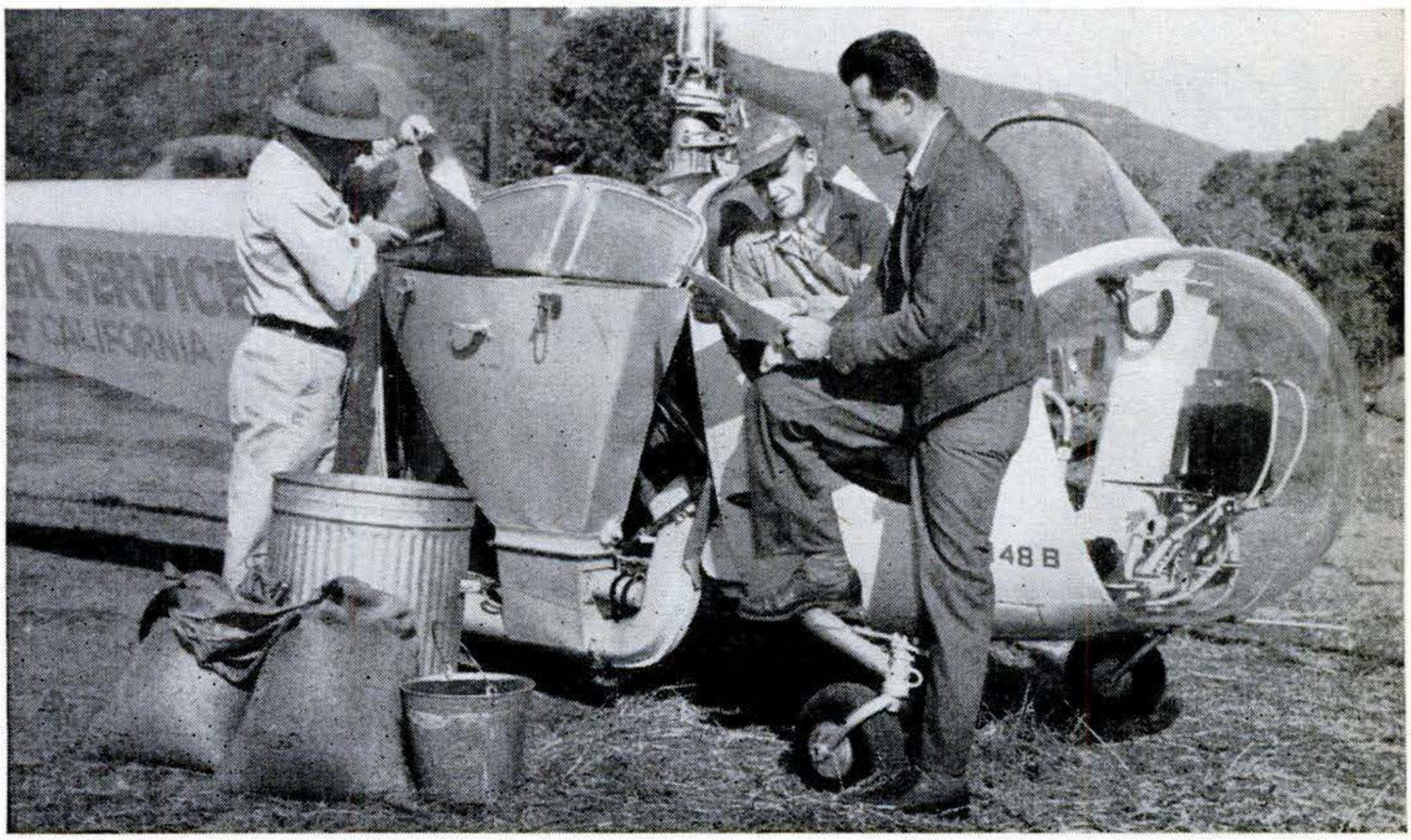


Helicopters Fight Erosion

IN California, they're sowing "dams" by air in the form of thousands of tiny yellow mustard seeds. Dropped by a pair of specially equipped, low-flying helicopters, the seeds take root quickly, checking surface-water runoff and promoting ground seepage. Use of the seed-sowing planes is an emergency move, directed by the U. S. Forest Service, to head off erosion of 1,000 fire-denuded acres of the Los Angeles watershed.

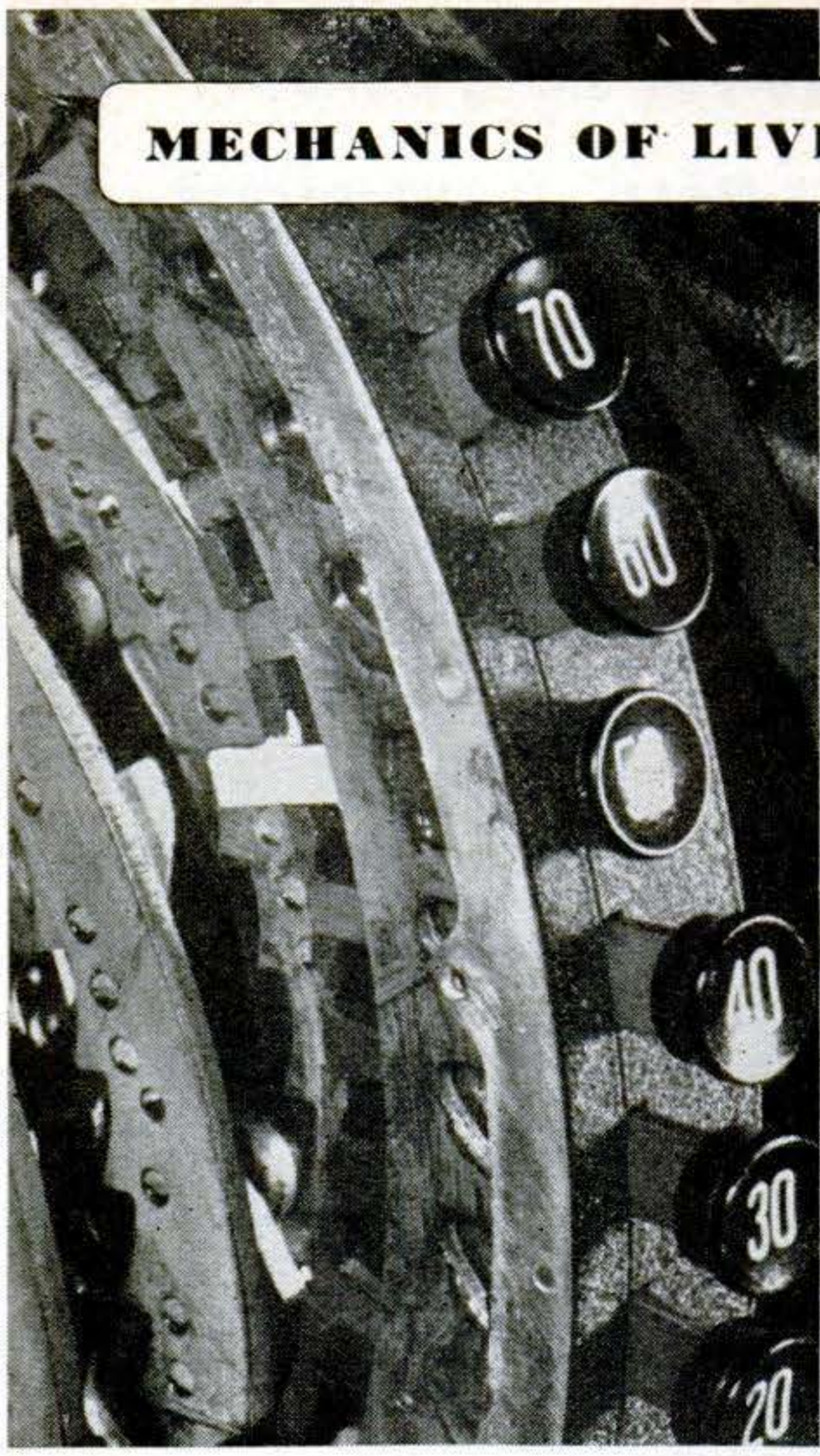
The Bell 48-B helicopters are each equipped with two seed hoppers. A power-driven agitator works the seed into the discharge pipe, where a 120-m.p.h. air blast from the engine's cooling system fans it out through finned openings. The down-wash from the helicopters' rotors drives the seeds into the ground and helps to keep them from being blown or washed away. At ground stations, observers check seed concentration in foot-square plots. Necessary changes in speed, altitude, or hopper openings are then radioed to the pilots.

Early test runs at altitudes as low as 30 feet ran seed concentrations up to 2,700 per square foot. By increasing the altitude to 100 feet and the speed to 60 m.p.h., and reducing the hopper openings, the ideal of 20 seeds per square foot was obtained.

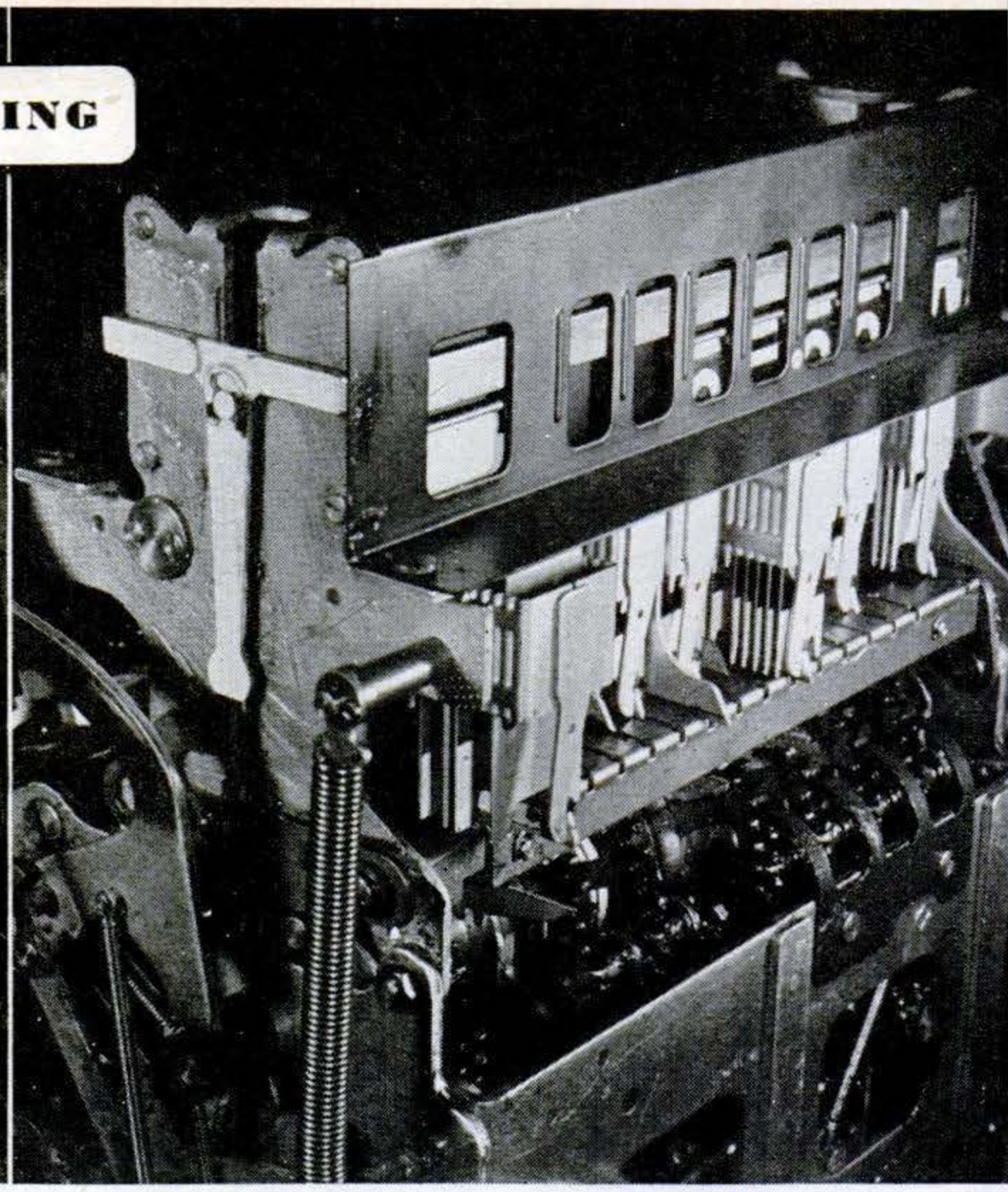


Seed hoppers holding 200 pounds apiece are slung on outside of fuselage, one on each side.

Copyrighted material



Punching a cash register key sends a stem down to stop a gear wheel in the proper position. The gears move from the zero setting when the operating bar is pressed. In this picture, key stem and corresponding gear tooth are painted white and the key bank partly removed.



The gears move boxes holding indicator cards a distance that depends on the key punched, positioning proper cards under fingers on a rising bar (left, painted white). Fingers pick cards from boxes and lift them to windows. Notice "5" moving into view in window at top.

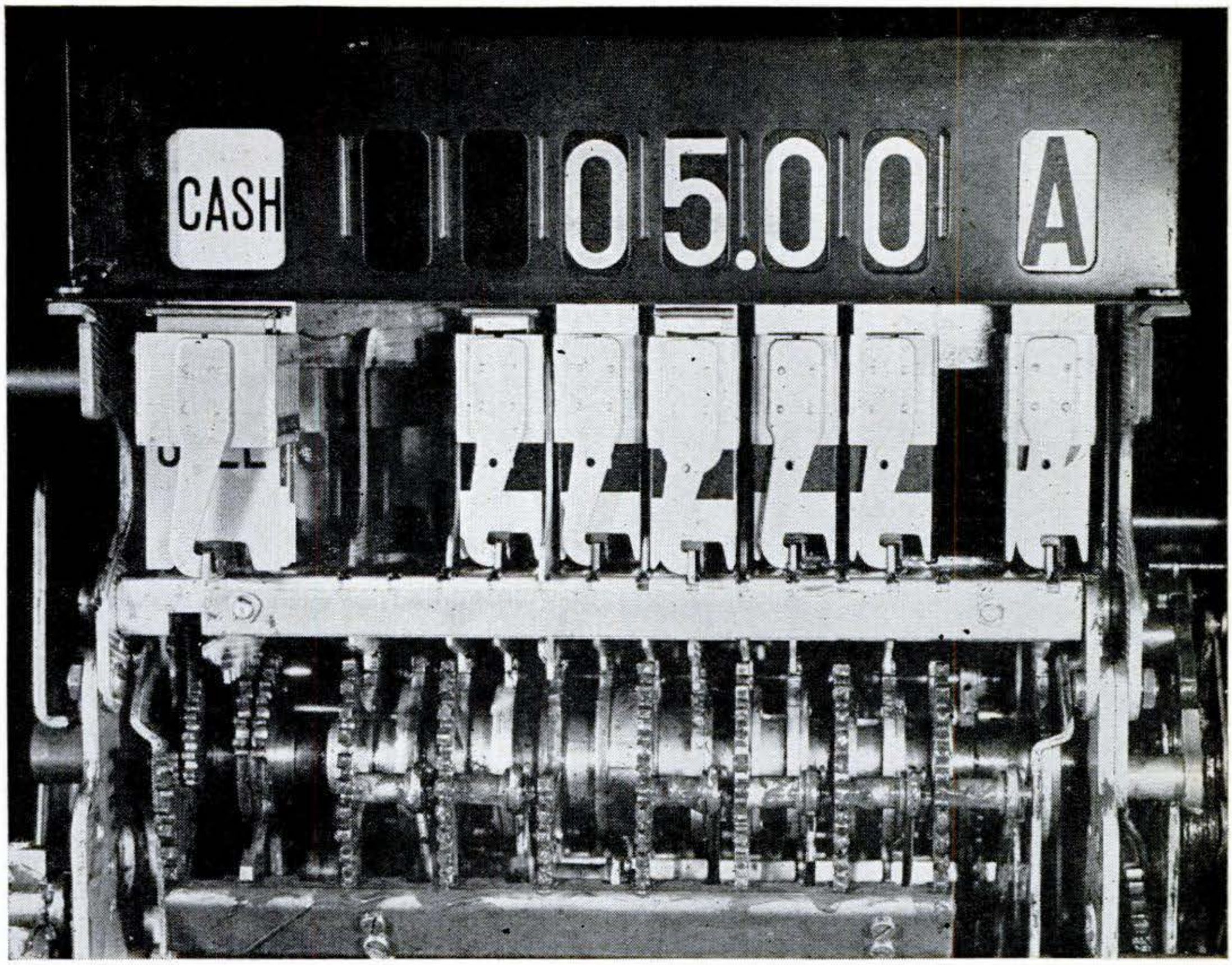
How a Cash Register Works

CASH registers have come a long way since James Ritty built the first one in 1879. His invention was simply a register and nothing else—the keys moved hands on a clocklike dial to indicate the amount of a sale. Now the modern machines do practically everything but tie up the package.

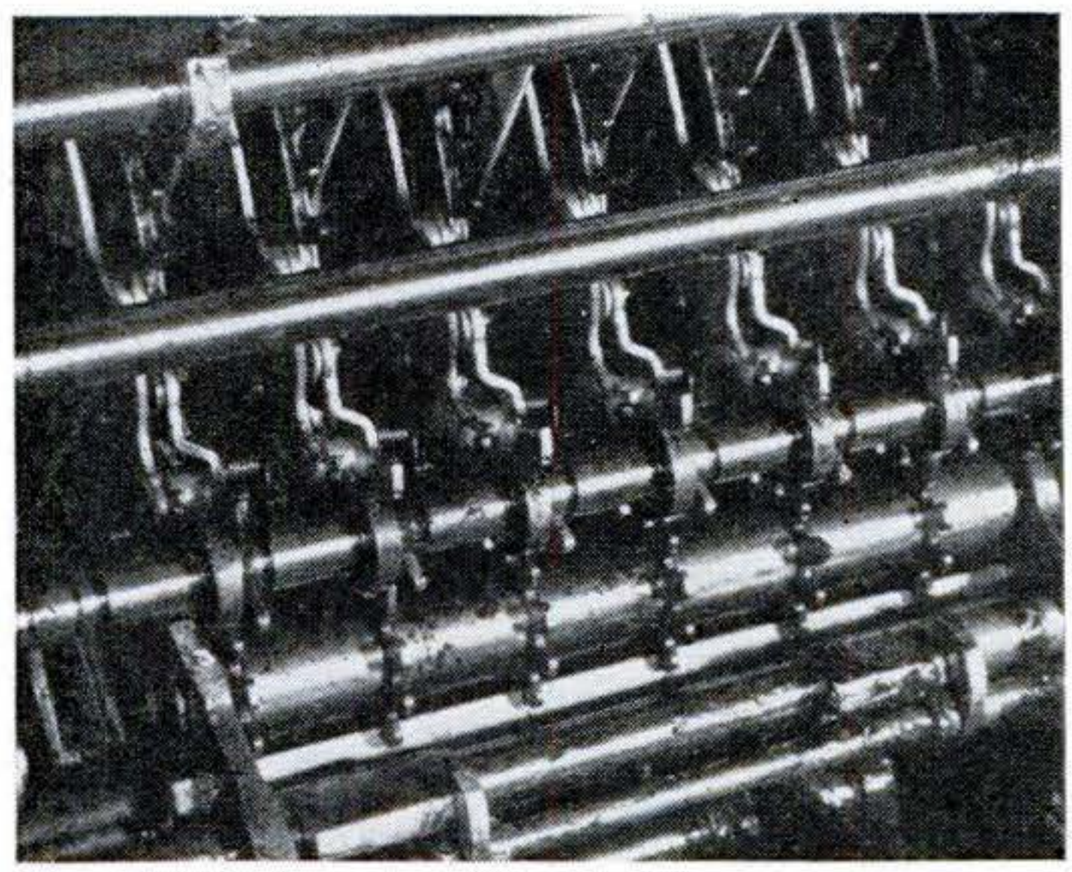
Some of the bigger models used in department stores have six cash drawers, a separate one for each of six clerks. Dials tell the manager how much each clerk has sold and how many sales he has made. Other dials keep track of payments made on credit accounts and petty cash paid out.

The National Cash Register Co.'s model shown in the photographs, a standard one used in many kinds of businesses, has one cash drawer and dials that count sales and total amounts. It prints a sales record, gives a receipt, and stamps the sales slip.

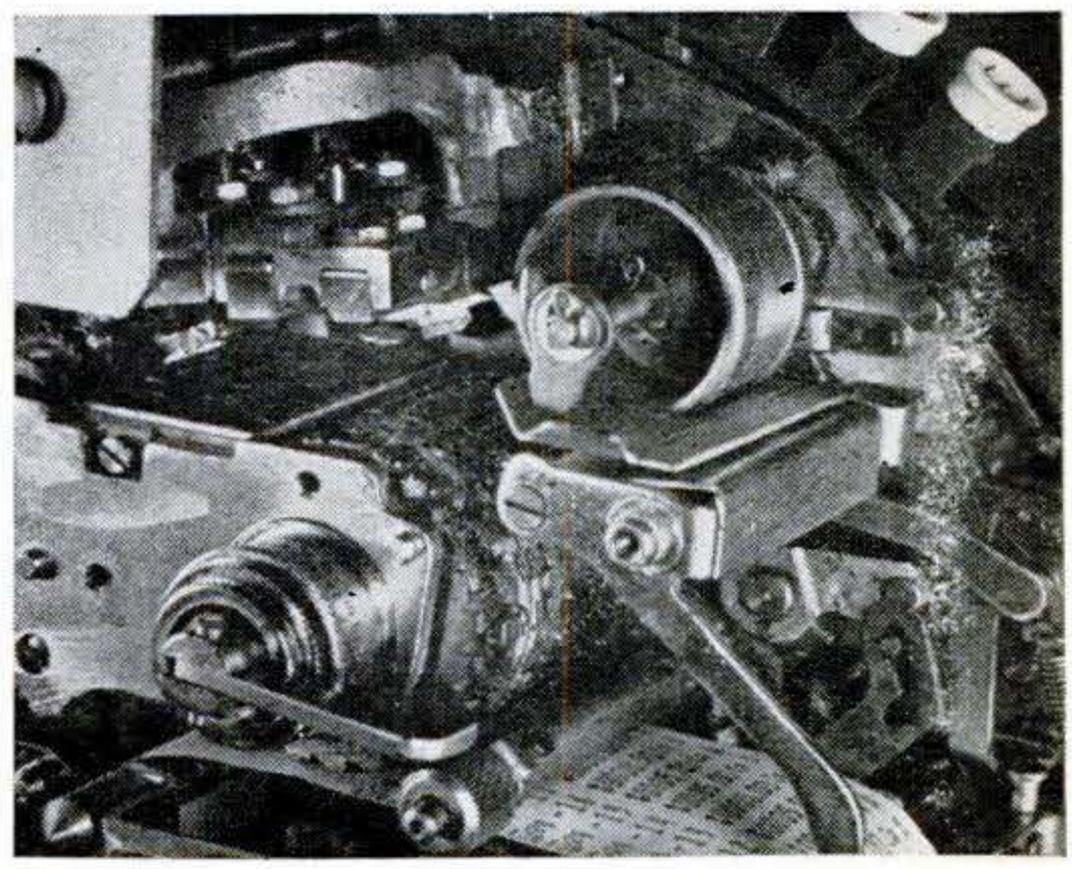
Copyrighted material



When all the gears and moving arms have finished their operations, the register shows a $5.00 sale. The center box shifted out to the "5" position while the other numeral boxes stayed at zero. The box at far left moved to locate the card indicating the transaction (cash) and the box at far right gave a card identifying the clerk. Actual movement of the indicator boxes is accomplished by the gears at bottom, which are connected to the gear wheels in the front of the register (shown in photo on other page). A small electric motor furnishes power.

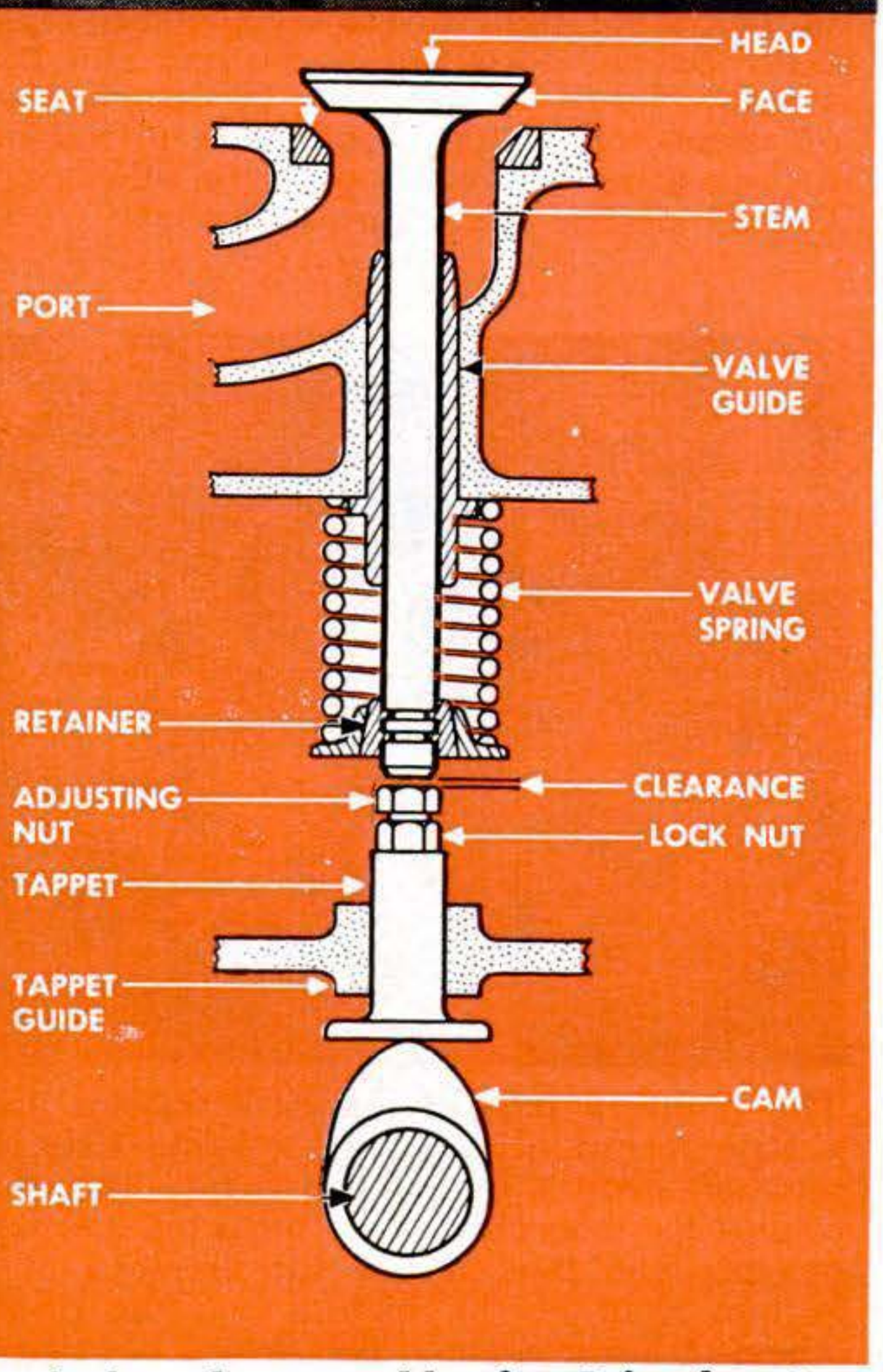


The gear train shown above transmits information set up on the keys to the dials that tell how much money was taken in and paid out, and how many sales were made. This part of a cash register is essentially a standard mechanical adding machine. The merchant can also secure a printed record of the total day's business from some types of registers by pressing special keys when he checks up at closing time.



The printing part of this cash register makes a tape record of each sale (listing date, sale number, amount, type of transaction, and clerk), stamps the sales check, and turns out a separate receipt. The tape record can be seen at the bottom right of the picture and the printing wheel at lower center. This wheel has two sets of numbers to print record and receipt at once. Sales slip is then moved to stamping position.

Copyrighted material



Here's the valve assembly of an L-head engine. Valve seats are refaced as shown in the photo.

An Expert Tackles a Valve Job

By R. P. Stevenson

PSM photos by W. W. Morris

YOU can't drive a car forever without getting a carbon-and-valve job. Sooner or later, the engine begins to knock badly, idle roughly, or skip under load. Or perhaps a mechanic looks up from a compression gauge and tells you the compression is low in one or more cylinders.

When Model T's were stylish, lots of men did the job themselves, and it's still within the range of the man who likes to work on his own car. But in many ways, the job no longer is as simple as it once was. So, whether you are a hot man under the hood or turn the job over to a mechanic, you should know how an expert does it.

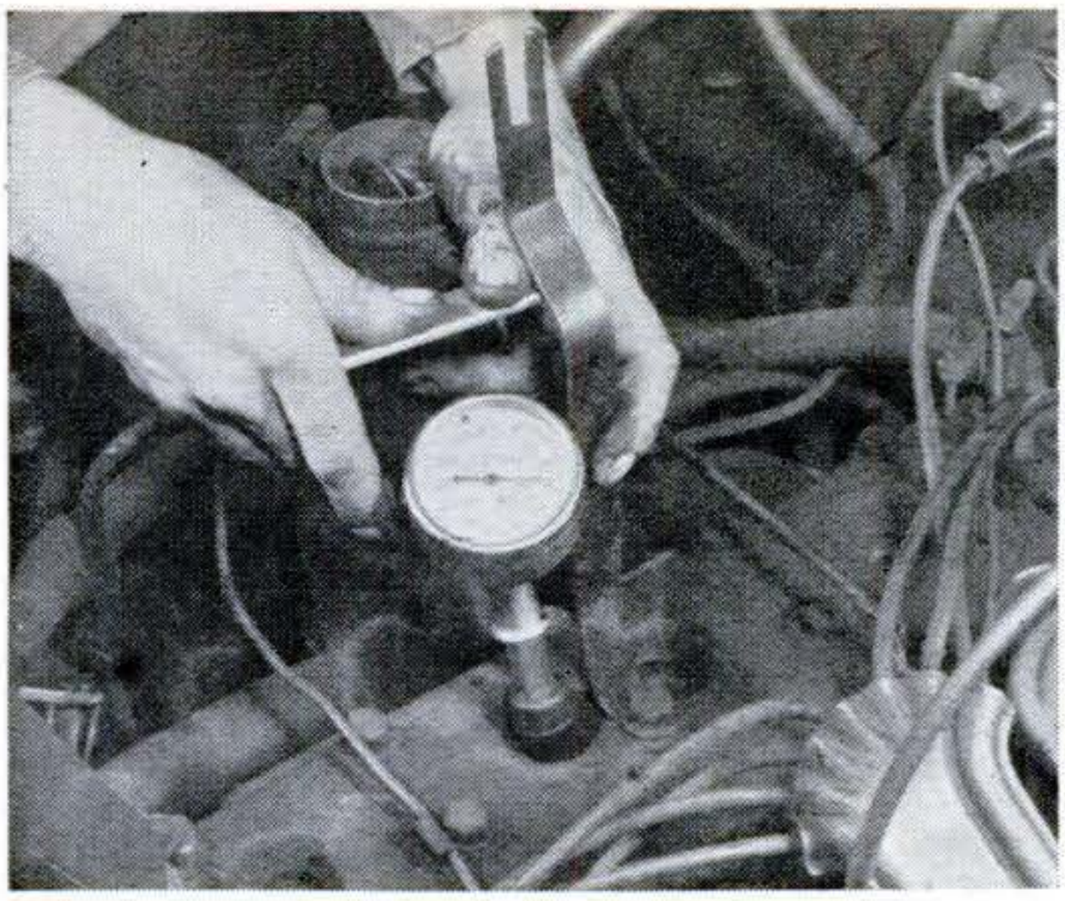
Your expert in this case is John Kowalski, who spends a great many of his working hours peering into cylinder blocks in the shop of James F. Waters, Inc., a company that operates one of the largest service garages in the East. These are pictures of an actual job performed on a 1941 Plymouth. The procedure may be considered typical for an L-head engine.

One thing you will notice is that the valves aren't ground against their seats; instead, every valve and seat is refaced. Because this can be done uniformly, the valves need not be kept in order.

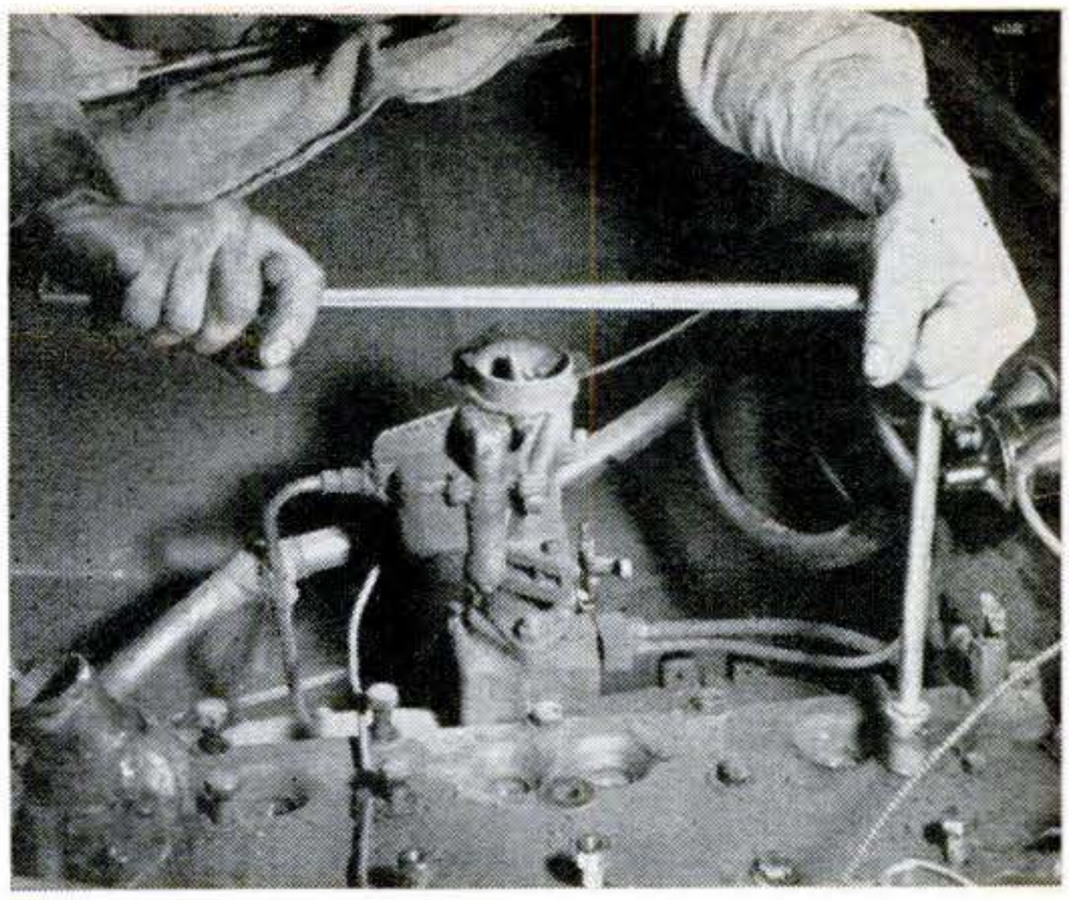
Although not shown in the sequence of photos, the mechanic also checks each valve spring with a spring-compression tester, discarding those that don't come up to a specified pressure. To keep the valves from sticking when the engine is first started, a drop or two of oil is placed on each stem before reassembly.

Along with a carbon-and-valve job, Plymouth factory policy specifies a complete engine tune-up. A working period of eight hours is allotted for the entire job.

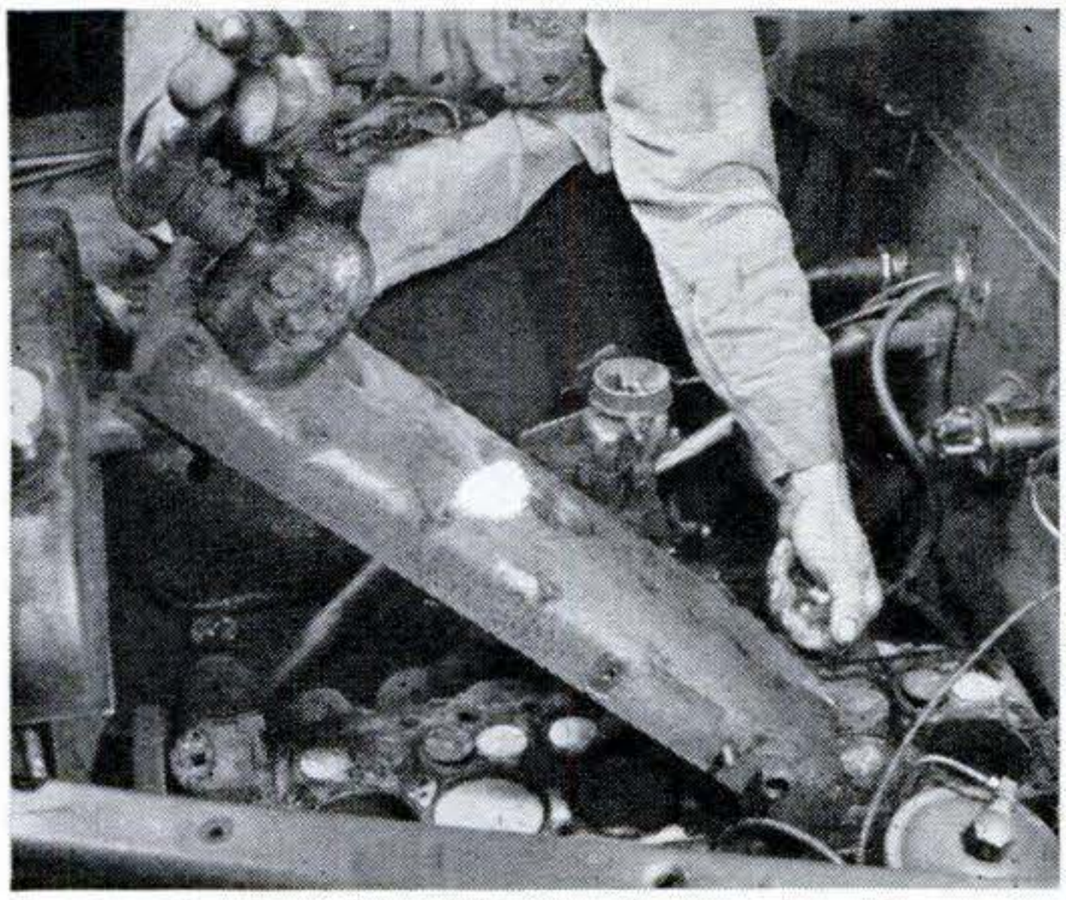
Copyrighted material



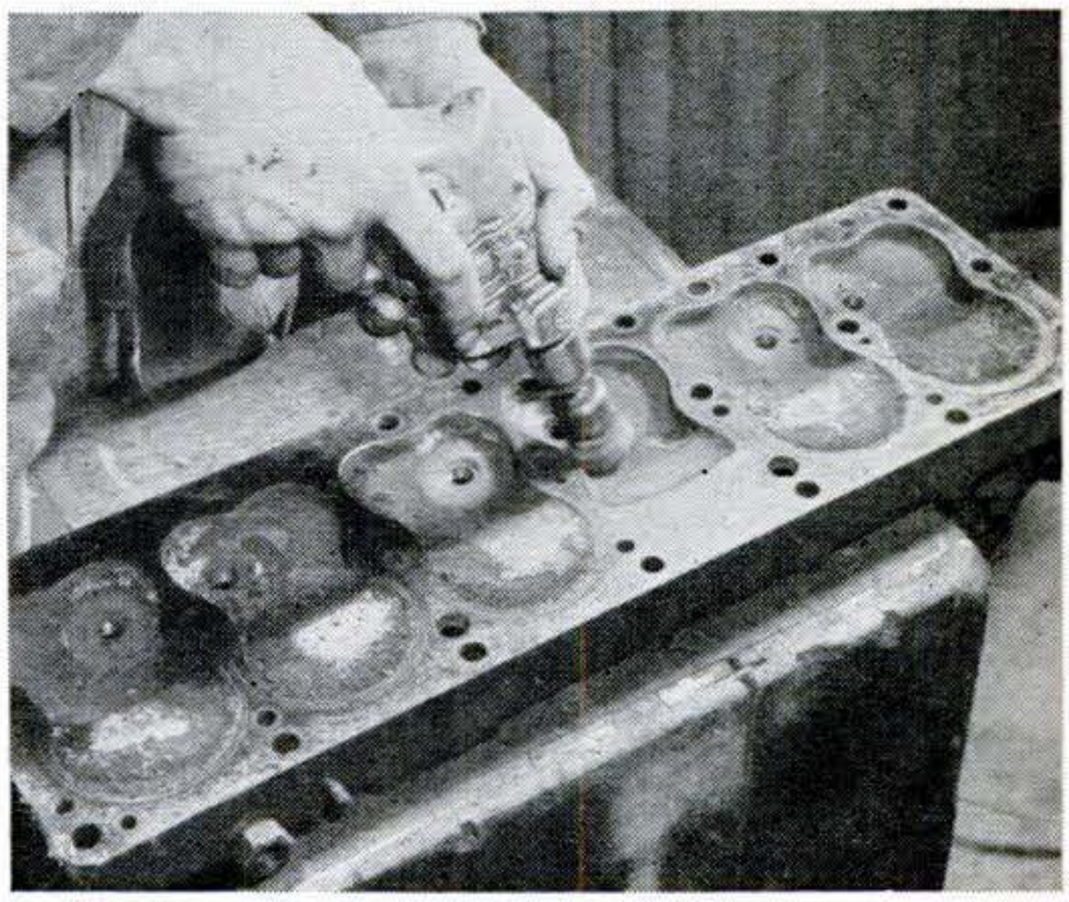
1. A compression gauge hints that the job is needed, as a low reading suggests that a valve is sticking or burned. In this shop, compression is always tested as part of a regular tune-up.



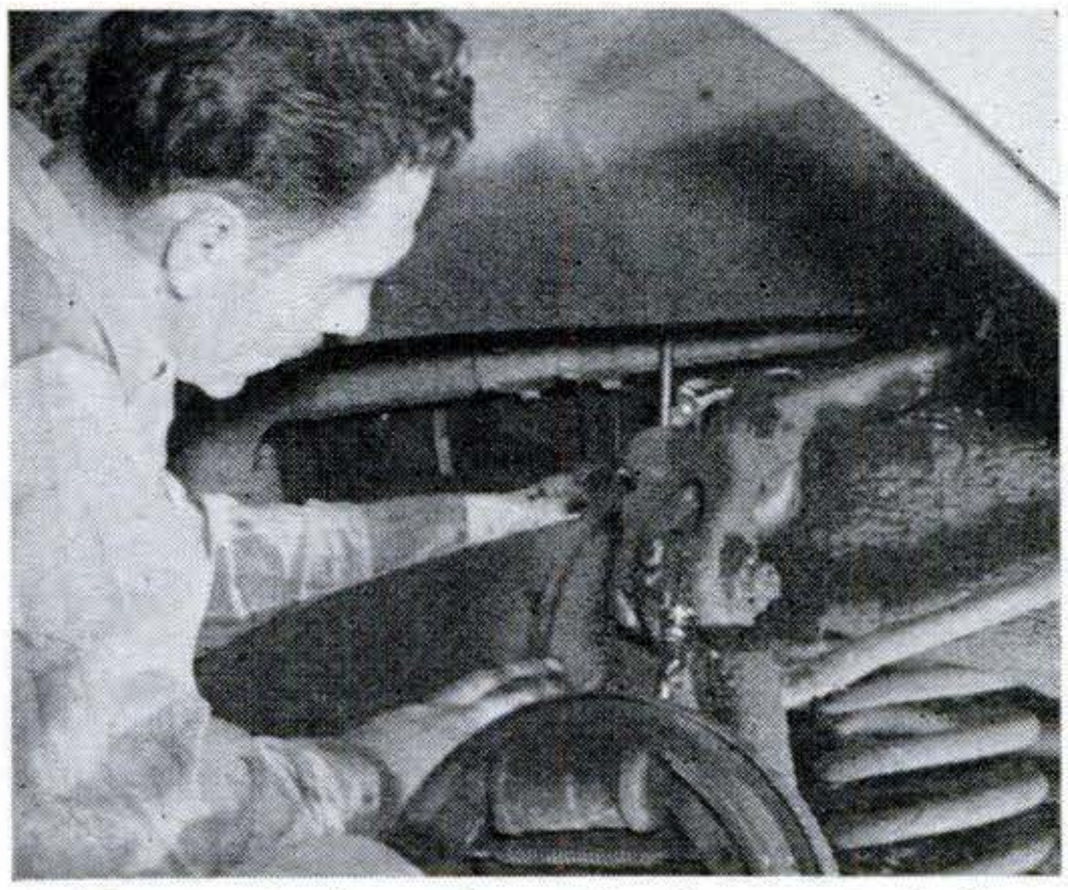
2. The job begins. To clear the way, the water is drained off, and the hose, air cleaner, oil filter, distributor, and wiring are removed or loosened. Then head bolts are removed as above.



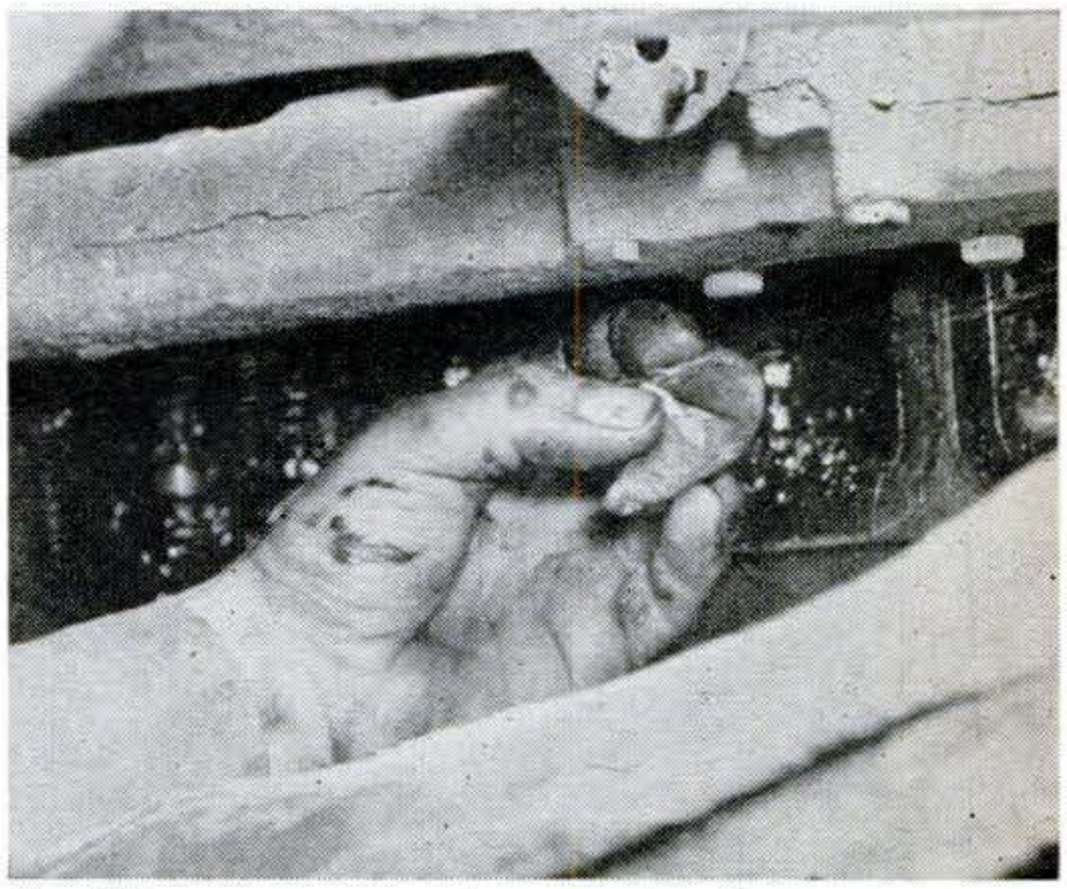
3. As the head is lifted off for cleaning, carbon may be seen on the piston and valve heads. The mechanic gets a good grip on the head; even aluminum ones are awkward to handle.



4. Carbon is cleaned from the cylinder head with a wire brush chucked in a small electric drill. This step could be postponed until just before it is time to reinstall the head.

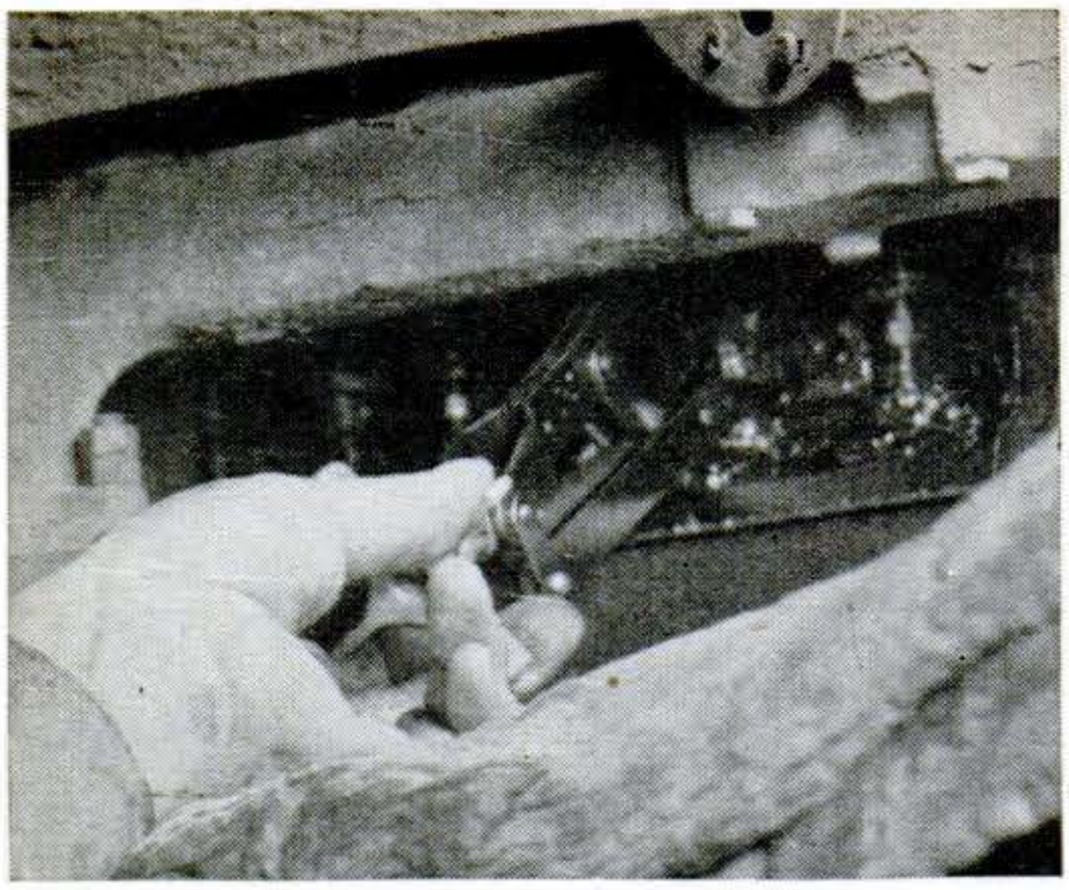


5. To reach the valves, the front is jacked up and the right wheel removed. Then the mechanic takes off the fender plate, heat shield, fuel line, and (above) side plates over the valves.



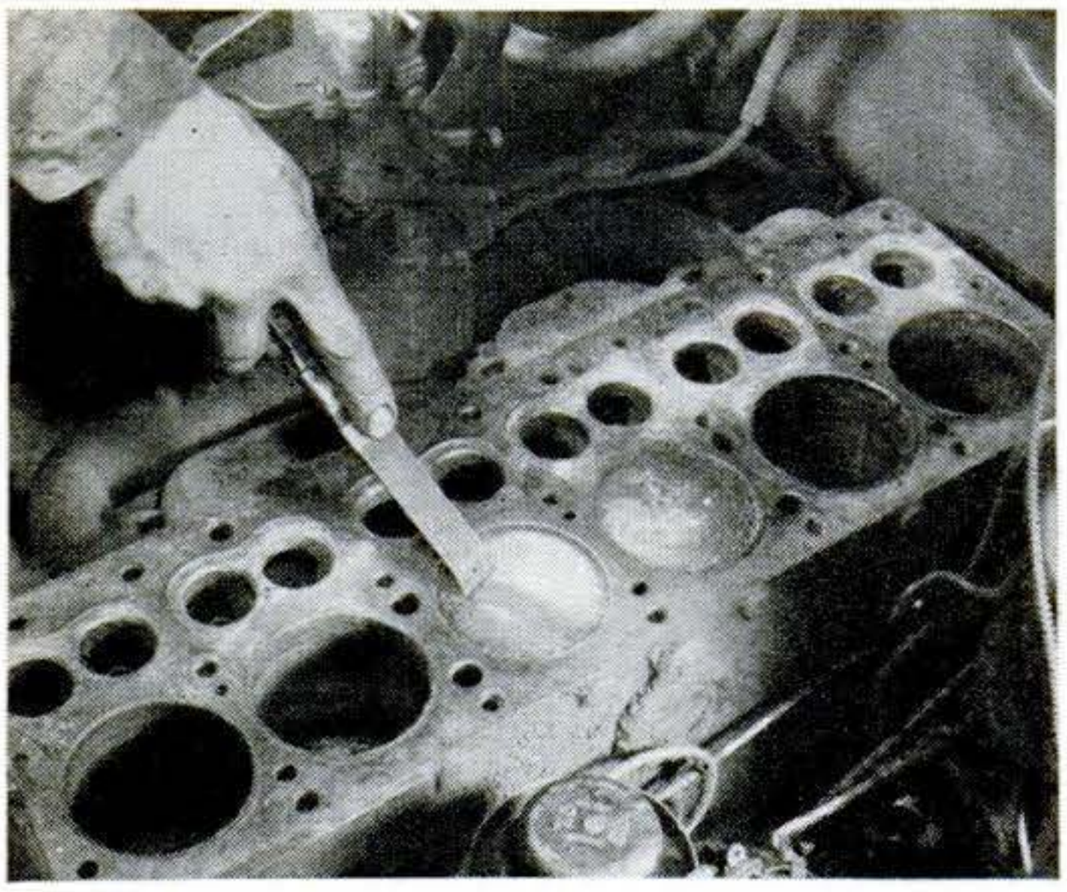
6. Oil-return openings near the tappets are plugged with cloth before the valves are touched. This keeps the small locking keys from falling into the crankcase. [*Turn the page.*]

Copyrighted material



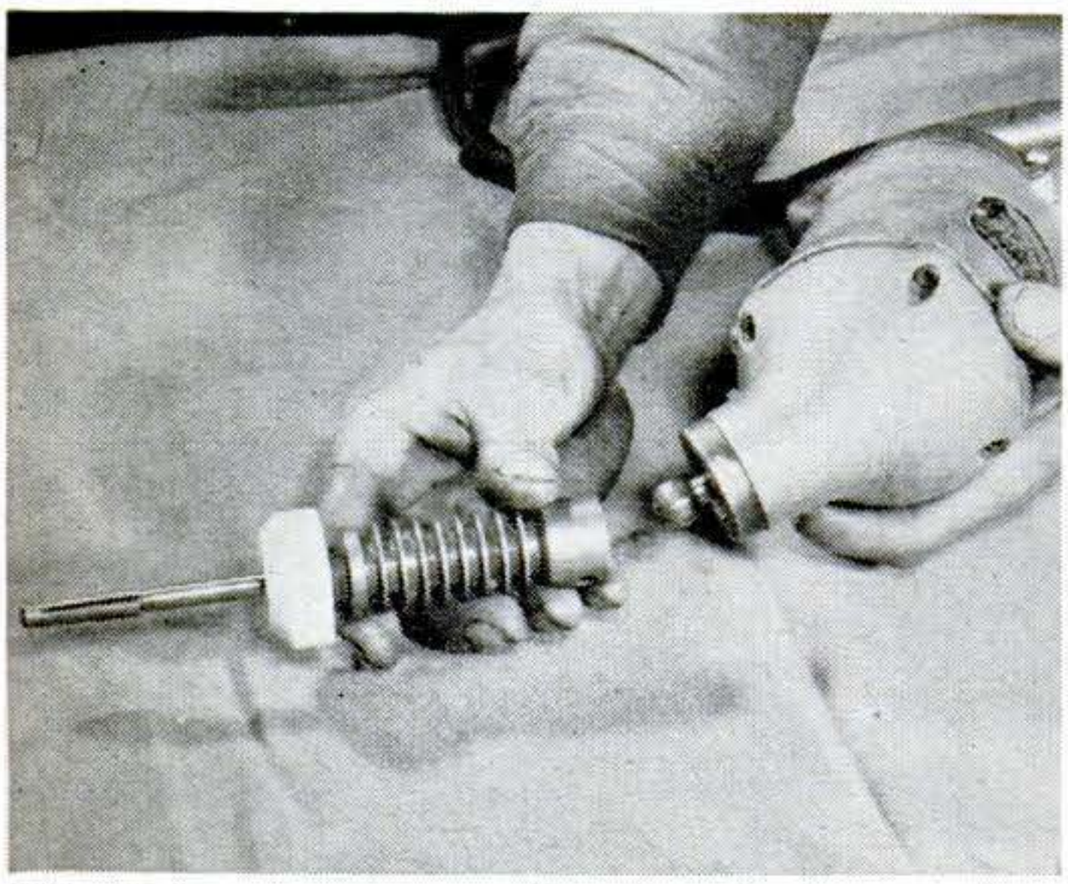
7. Inserting a valve lifter, the mechanic now compresses the spring so that the keys may be removed. Before this, he checks to see that the valve is in the down position; that is, closed.

8. Using a mallet, he taps the valve head after it has been raised by the lifter. This loosens the keys for removal. Unless it is stuck, the valve can now be lifted out with the fingers.

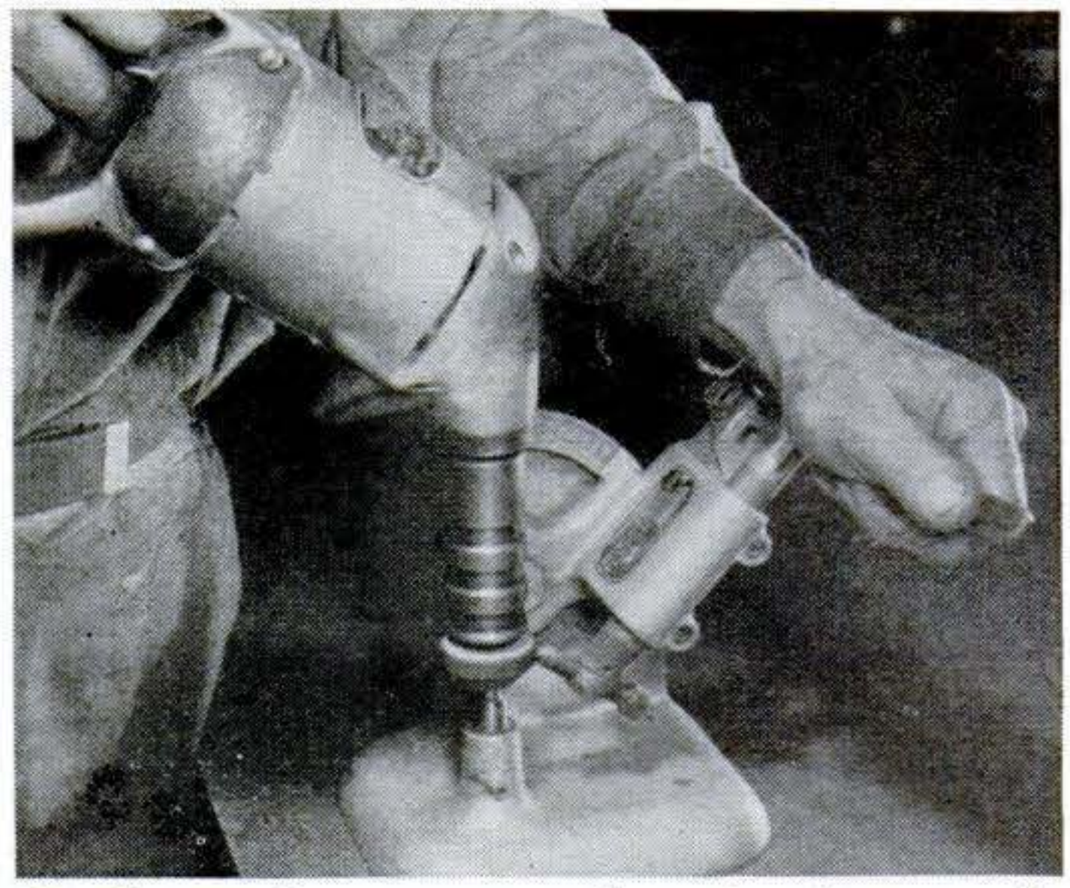


9. Carbon is scraped from the piston heads and the entire upper surface of the block when all valves have been removed. The mechanic works carefully to keep scrapings out of the bore.

10. All valve guides are cleaned with a reamer chucked in the ever-handy drill. Sometimes, a guide is worn so much that it must be replaced. Note the clean block after the carbon removal.



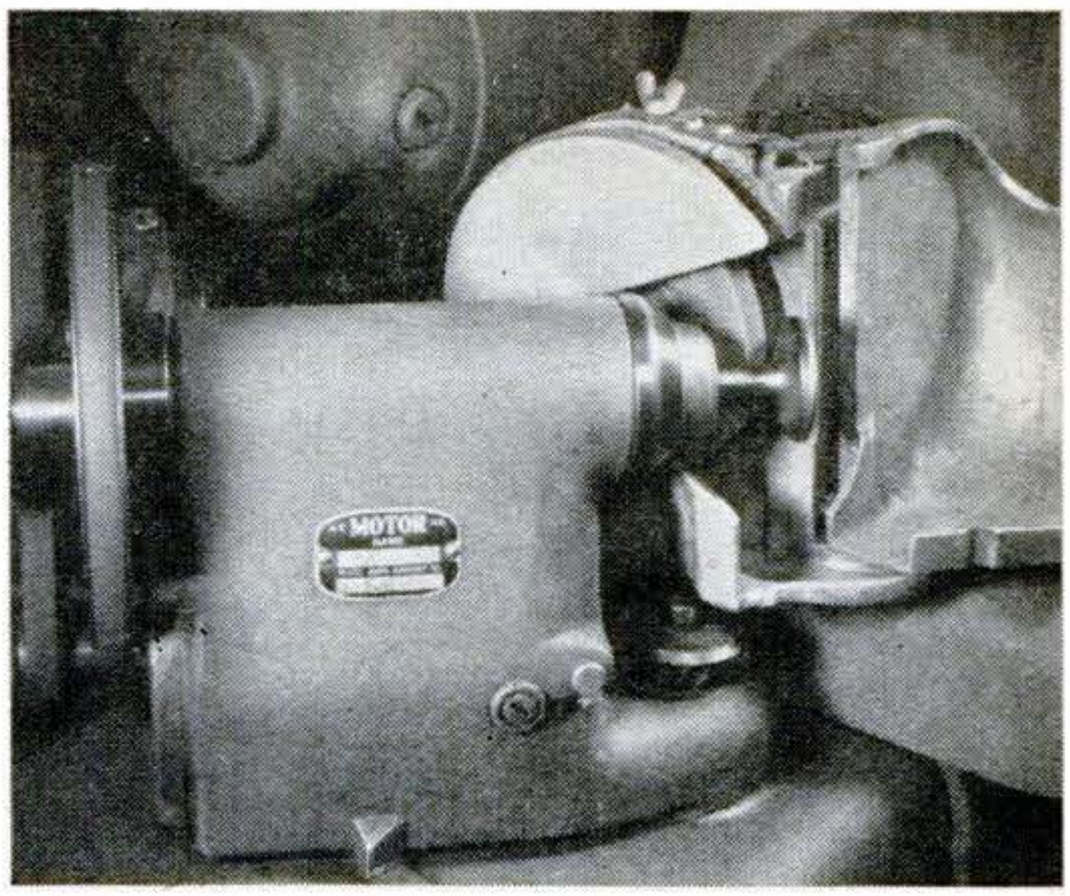
11. Valve seats are refaced with this grinding tool, shown in use on page 168. The protruding stem keeps the stone and seat in proper relationship. The grinder has a 45-deg. face.



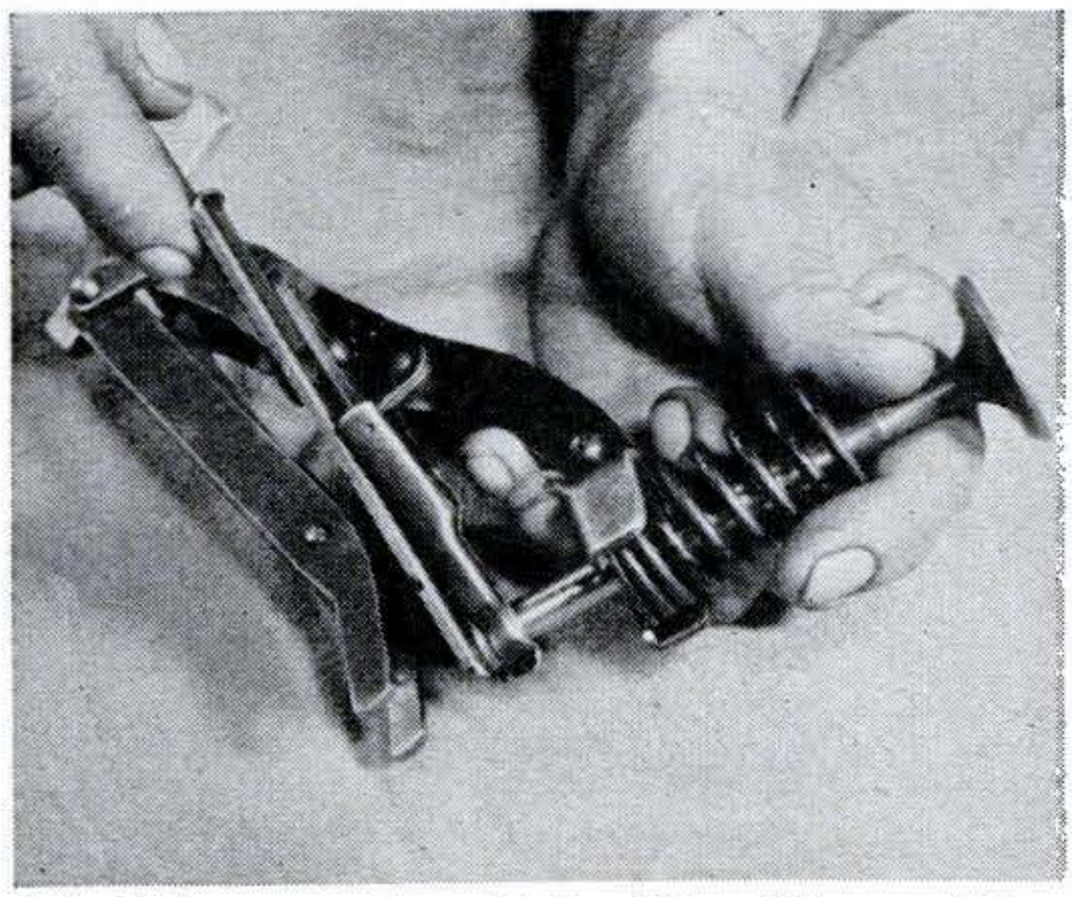
12. Since the seats must be refaced at exactly 45 deg., the cutting stone is dressed from time to time in this way. In some cars, for instance the Pontiac, the valves are seated at 30 deg.

Copyrighted material

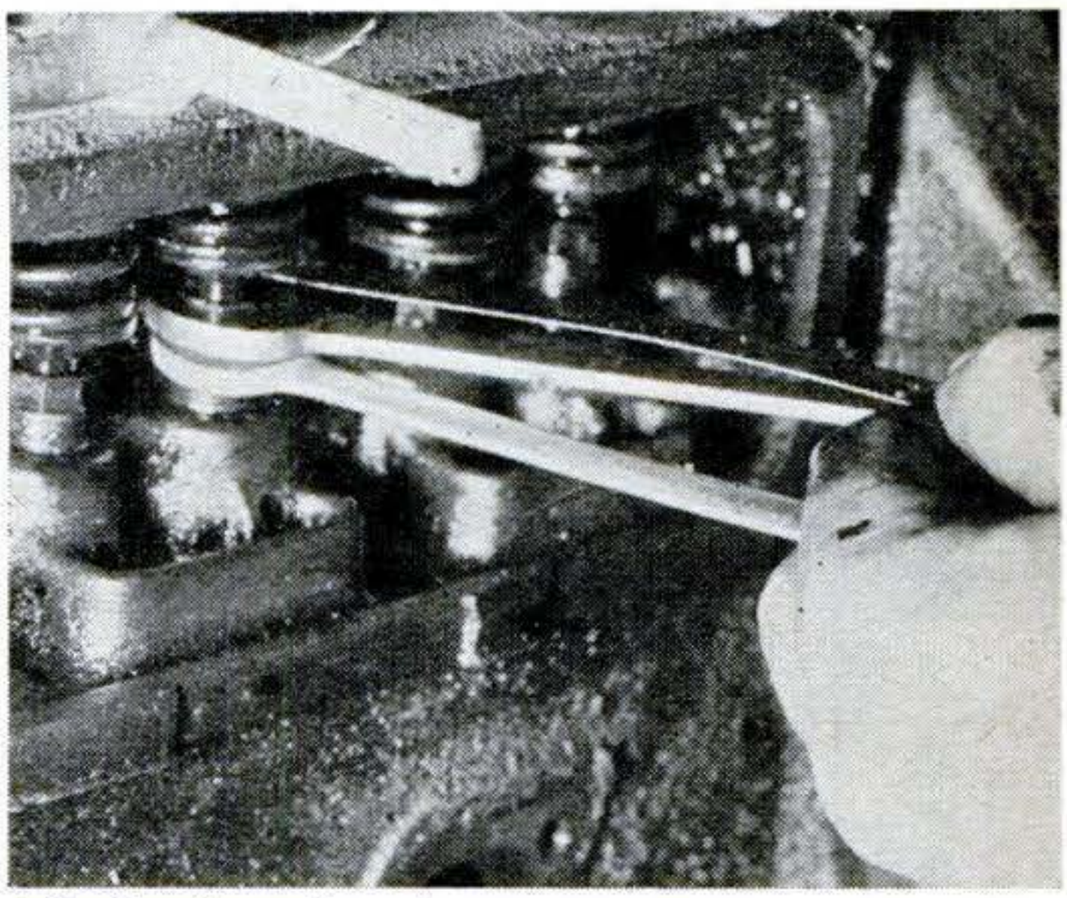
13. Valves are cleaned with a power brush in a machine shop adjoining the garage floor. The carbon quickly comes off and the metal of the head, face, and stem is left bright and shiny.



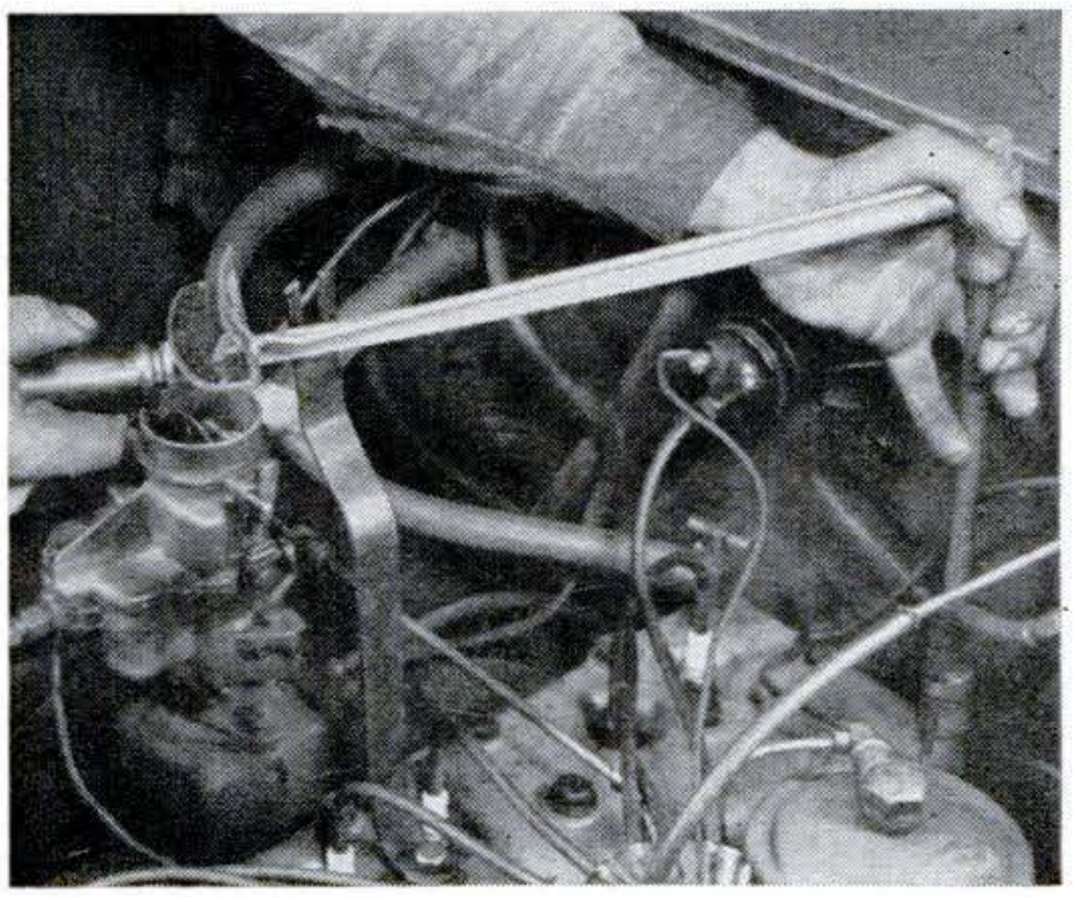
14. Valve refacing is next. Each is mounted so its face contacts the grinding wheel at 45 deg. Valve and wheel revolve in opposite directions. The ends of the stems are also faced off square.



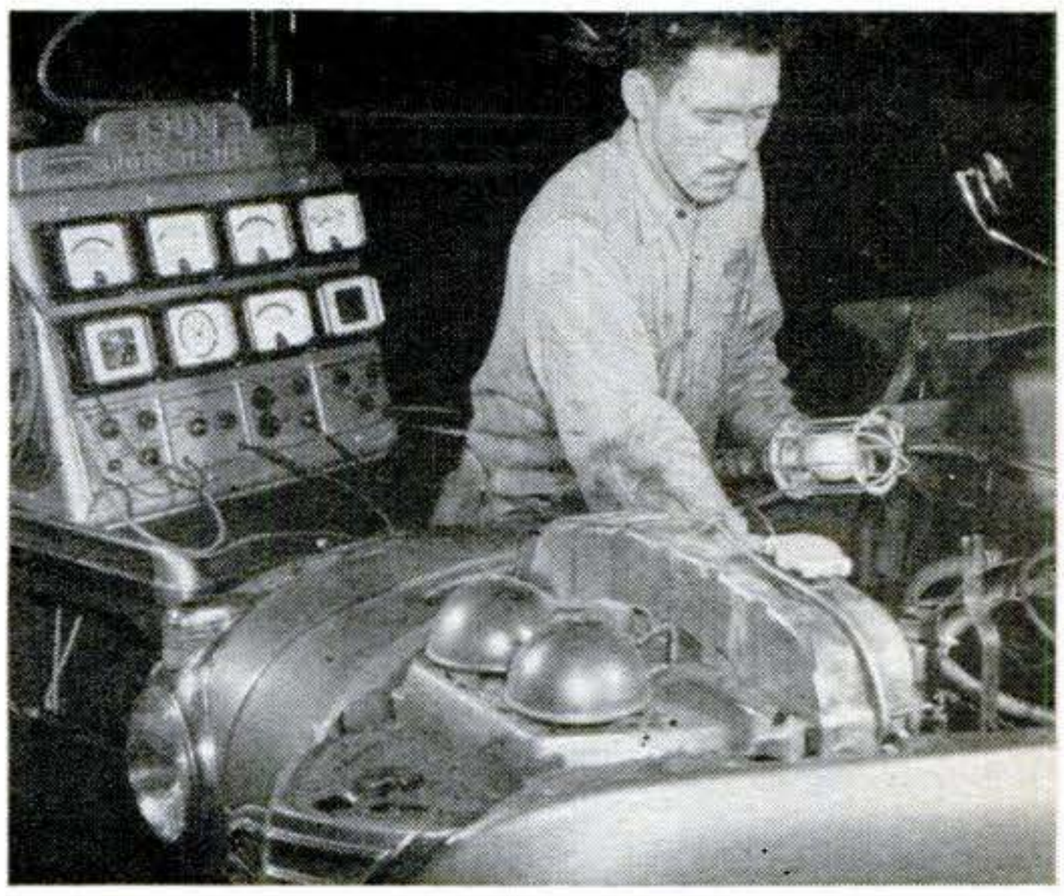
15. Valves are installed with a lifter and key inserter. When the lifter is removed, spring tension forces the retainer down over the two small keys, locking them in place on the stem.



16. Setting the clearance is an exacting step. With one wrench on the lock nut and another on the adjusting nut, a feeler gauge does the job. Here, intake clearance is .006", exhaust .008".



17. A torque wrench sets the head bolts at the proper tension as the final step. New gaskets are installed, of course, before the head and valve-cover plates are returned to place.



18. When the job's complete, a motor analyzer gives the car a checkup before release to the customer. It tests compression, timing, setting of the points, and carburetor adjustment.

Copyrighted material

From the back of his car, Kiskum exhumed an easel, a canvas, and a palette, and went quickly to work.

Gus Wilson and the Deepee

The little artist had no money, but he had a smooth tongue and a problem Gus knew how to solve.

By Martin Bunn

"HERE stands Kiskum."

Mrs. Miller giggled, and Gus Wilson turned to stare at the man unexpectedly there beside them. They saw a little fellow dressed in paint-smeared corduroy pants, a threadbare shirt—also paint-specked—and a velvet ribbon that was twisted into a flaring bow around his neck.

"So what?" said Gus.

The visitor jabbed the end of a long index finger into his chest. "Kiskum—me! The lady will permit that I resume the chapeau?" He bowed in the direction of Mrs. Miller. Flashing a likable smile, he pulled on a

Copyrighted material

stained blue beret. "Here stands Kiskum. You, meestair?"

"My name's Wilson." Gus laughed.

Kiskum grabbed his hand and pumped it vigorously. "Pleestameetcha! You geeve me a wranch, heh?"

"Why should I give you a wrench?"

"I geeve heem back queek."

"Oh—that's different," Gus said. "What kind of wrench?"

"A munkey wranch." Kiskum's fast-moving hands measured off eight inches of air. "Like so."

Gus got him the tool. Kiskum bowed to Mrs. Miller and marched to the door.

"Such an *odd* character!" gushed Mrs. Miller.

Gus sadly surveyed the ruin that Mrs. Miller had made of a good automobile engine and got back to the diagnosis that Kiskum's arrival had interrupted. "I'm afraid you'll have to leave your car here till tomorrow," he announced.

Stan, who had gone outside, barged back into the shop. "That guy's got the floor boards up and he's taking off the cover of his transmission—with our wrench! Whatd'ya think of *that* for nerve!"

Gus laughed and went to the door. Mrs. Miller and Stan followed.

Muttering to himself, Kiskum was working on his car—an old one which had obviously had a hard life as well as a long one. He straightened up when he saw Gus. "I feex heem myself," he said hastily. "I got no kesh. I am a deepee."

"You're a what?" Gus demanded.

"A deepee," he repeated. "What you call a displeased person."

"Oh," Gus said sympathetically, "A displaced person. That's tough. Did the war—"

Kiskum shook his head violently. "It is not the war which has displeased me. It is my landlord. I got no kesh. He displeases me on the sidewalk. So!"

Gus smothered a grin. "That's tough, too. What are you going to do now?"

Kiskum's expressive hands sketched a wide gesture. "I trevel," he declared. "But my car it goes only in the slow motion." The man yanked at the gearshift lever. "He stick in the low gear. So!"

Copyrighted material

Gus nodded. "How long has the gearshift been stuck?"

Kiskum shrugged his shoulders. "Since I start to trevel this morning. Before that —two, three months."

"Do you mean to say," Gus demanded, "that you've been driving in low gear for two or or three months?"

"I feex heem," Kiskum explained, "but he don't stay that way. When he stick the first time, I go to the garage. The mechanician say my transmission got to be overhauled. I got kesh. I have it done. Two weeks more, he stick again. The mechanician say my transmission got to be—how you say it—rebushed. I got no kesh, so I drive in slow motion to the lot where I stand my car. I take off the transmission cover and look inside. When I put it back it works fine. But it sticks again. Every three times I drive I feex heem once."

Gus rubbed his chin. "I'll take a look."

"I got no kesh," Kiskum warned.

"I didn't say I'd fix it for you," Gus replied gruffly. "I just want to look."

It didn't take him long to find out what was wrong. The shifting rods were loose in the transmission case—the bushings in which they rested had worn sloppy. As a result, the end of the shift lever could climb out of its notch in one position. When this happened, both lever and rod jammed fast.

"It can be fixed," Gus told Kiskum, "but it would be rather expensive to do it properly."

"I got no kesh," Kiskum said glumly. His face brightened. "I propose to you a swap. You feex my car—I paint your peecture."

"An artist!" Mrs. Miller gurgled.

"I am what you call a helluvagood artist," Kiskum said with dignity. "I show you." He reached into the back of his car and yanked out large paintings and small ones which he propped in a row against the shop's wall. Mrs. Miller greeted each addition with a squeal of delight. He made a final trip to his car and came back with a portait of an unwholesome-looking old man with a cockeyed leer and a hobo beard. "My mesterpiece!" he told Gus proudly. "You feex my car, I paint you like heem. So?"

Gus had made up his mind that while this might be Art, he preferred the curvatious nifties on the shop calendar. "No soap," he said with finality.

Mrs. Miller had been digging frantically into her recollections of six women's club lectures on art appreciation. Now she came up with the word she had succeeded in remembering—she wasn't sure what it meant, but she isn't one to fuss about the meaning of a word so long as it sounds impressive. She gazed soulfully at the picture of the unprepossessing old man. "Beautiful—oh, beautiful!" she breathed. "What *chiaroscuro!*"

Kiskum went slowly over to her. "Madam permits?" Mrs. Miller giggled. He took her well-rounded cheeks between his palms and gently tilted her head. "Ah, yes—charming!" He turned briskly back to Gus. "You feex my car—I paint your lady. So?"

Highly delighted, Mrs. Miller started flustered explanations. Stan snickered. Gus grinned. "Well—O.K.," he said. "Help Stan push your bus into the shop."

Kiskum did. Then from the back seat he exhumed an easel, a canvas, and a palette. With the businesslike air of a man whose time is valuable he carried the shop's only chair over to a window, posed Mrs. Miller in it, and went to work.

So did Gus. He started by lighting his pipe while he stared thoughtfully at the exposed transmission. Then he drew out the gearshift lever and examined both the pivot ball and the end that engaged the notches in the shifting rods. "Seems to me," he told Stan, "all we have to do is get the lever to ride about three thirty-seconds lower."

"Sure," Stan assented. "All you have to do is weld on that much metal, grind it to the right shape, and case-harden it."

"Is that the only fix you can think of, son?" Gus asked.

"Heck, no! We could put in a new transmission or rebush the old one," here he lowered his voice to make sure it wouldn't carry beyond Gus's ears, "but I don't think Mrs. Miller's picture'll be worth that much to you—except maybe to hide a hole in the wall!"

His employer laughed and shook his head. "Try again, youngster. You're missing at least two good bets."

Stan pursed his lips, squinted, and assumed an expression of deep concentration. "Well, if you could take three thirty-seconds off the bell bottom—"

"Now you're getting there," Gus assented. "And you wouldn't even have to take off that much." He peeled off the gasket and measured its thickness. "One thirty-second. You'd only have to take off another sixteenth if you left out the gasket."

Copyrighted material

Stan nodded vigorously. "That's pretty neat, boss. Want me to do it?"

"Pretty optimistic, aren't you? It's no cinch to chuck that housing in the lathe."

"But you said. . ."

"I said that was one way. There's an easier way still."

"O.K." Stan let his shoulders slump with a defeated air. "I give up. You tell me."

"The pivot, of course. Take off the right amount of metal from the bottom of the pivot ball, and the lever will move down. Let's go."

With Stan watching, Gus applied a blowtorch to the bend of the shift lever, straightened it, chucked it in the lathe, and carefully turned a fraction of an inch off the ball. Then he rebent the lever.

"That should do it," he said. "You carry on, Stan."

Leaving Stan to his job, Gus walked across the shop. Kiskum looked up, "You feex my car?"

"It'll be ready to roll in a minute."

The artist brushed in a dozen swift strokes. "Completed—done!" He jumped up and bowed to Mrs. Miller. Almost before Stan could replace the floor boards, he had tossed his equipment into the car, hopped in after it, started the engine, and shifted gears. "Ah! I am out of the slow motion! Now I trevel!" The old engine roared; he waved his hand and drove out.

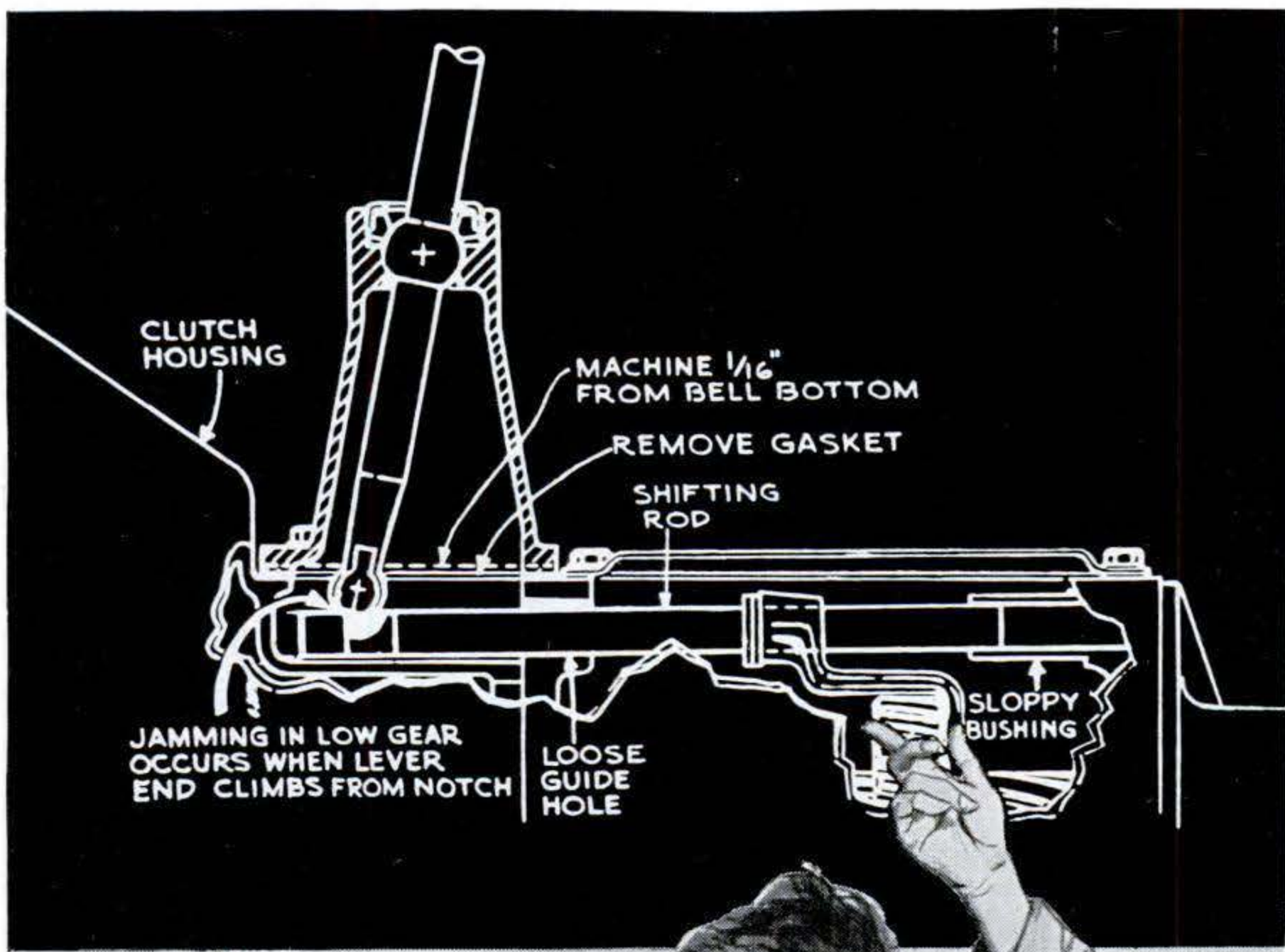
Mrs. Miller hurried over to look at her portrait. Her figure is generously upholstered, and Kiskum's brush had painted what his eyes had seen. From the canvas a fat, goggle-eyed woman stared back at Mrs. Miller. Her face reddened with rage. "I don't look like *that!*" she shrilled. Then she tried to smile. "Only, of course, it's Art! I'll hang it in the living room—yes, over the fireplace." Doubt assailed her again. "But I *don't* know what Henry will say!"

She floundered out, taking the still-wet picture.

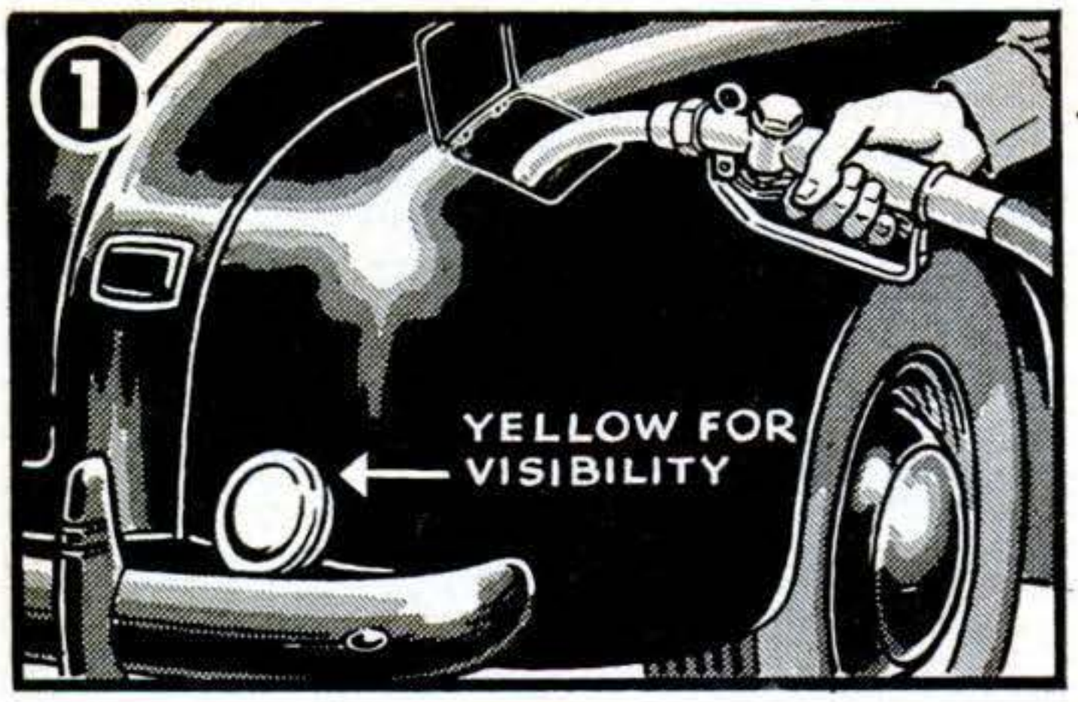
"I know what Henry'll say," Stan suggested, " 'When does the balloon go up?'—that's what! Lookit here, boss—I don't get it, the way we fixed that gearshift. We never did the job that way before."

"That's right—we didn't," Gus admitted, "but we never did the job on a car that was as badly treated as that one. A dentist doesn't put a gold inlay in a tooth he's going to yank. Kiskum's car has another year or two at most, so we gave him a quick, cheap, easy job that will work fine for at least that long. We saved time and money, Kiskum got a job that's plenty good enough, and Mrs. Miller got a portrait that's so much like her it hurts. You figure out who got the worst of the deal." END

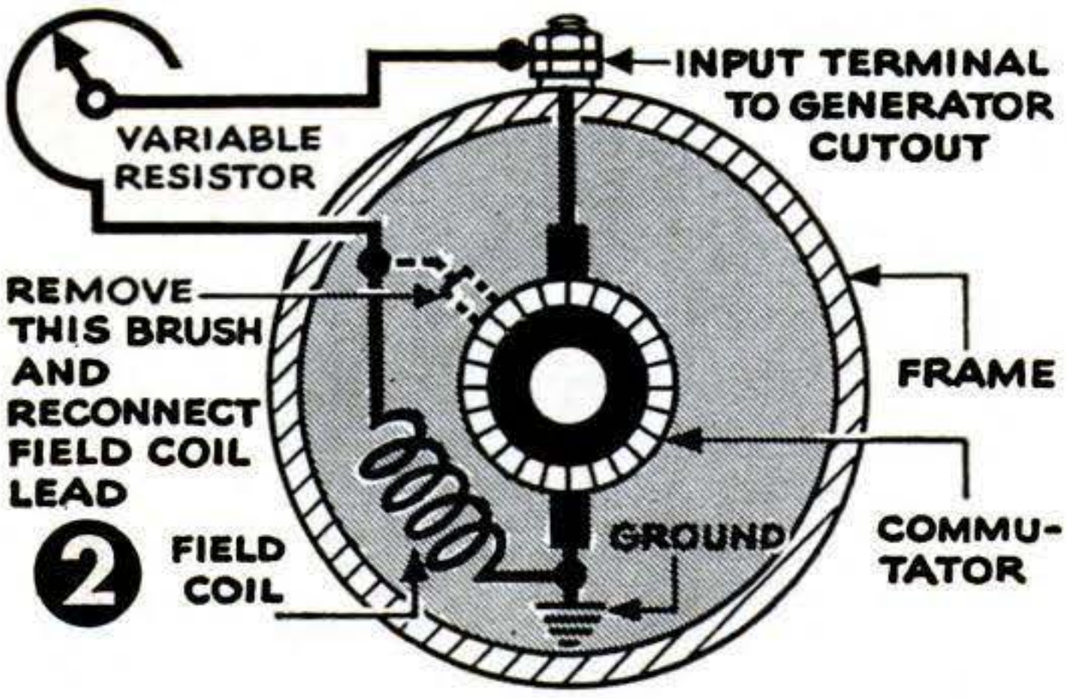
For Other Useful Auto Hints From the Model Garage, Turn the Page.



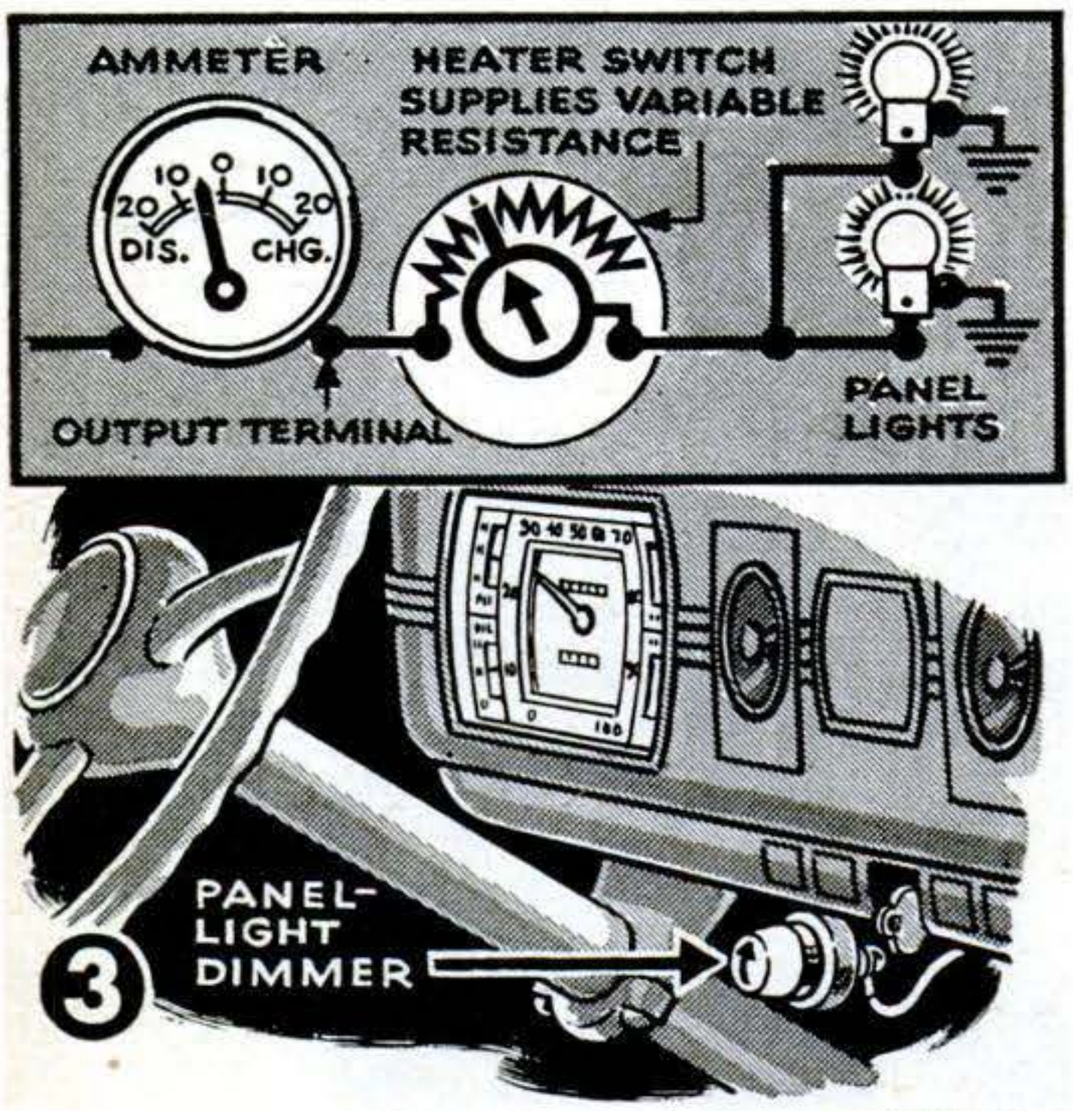
Hints From the



1. Watch Your Cap! Doc Kennedy drove into the Model Garage a couple of weeks ago and yelled for Stan Hicks to fill up his tank. Next day Doc turned up again, and accused Stan of forgetting to put the cap on the tank. Perhaps Stan did. Anyway, it was lost beyond doubt. W. Van Sandt, Long Branch, N. J., thinks grease monkeys like Stan would be less likely to overlook the cap if it were painted bright yellow for contrast. A good idea for the oil filler cap, too.



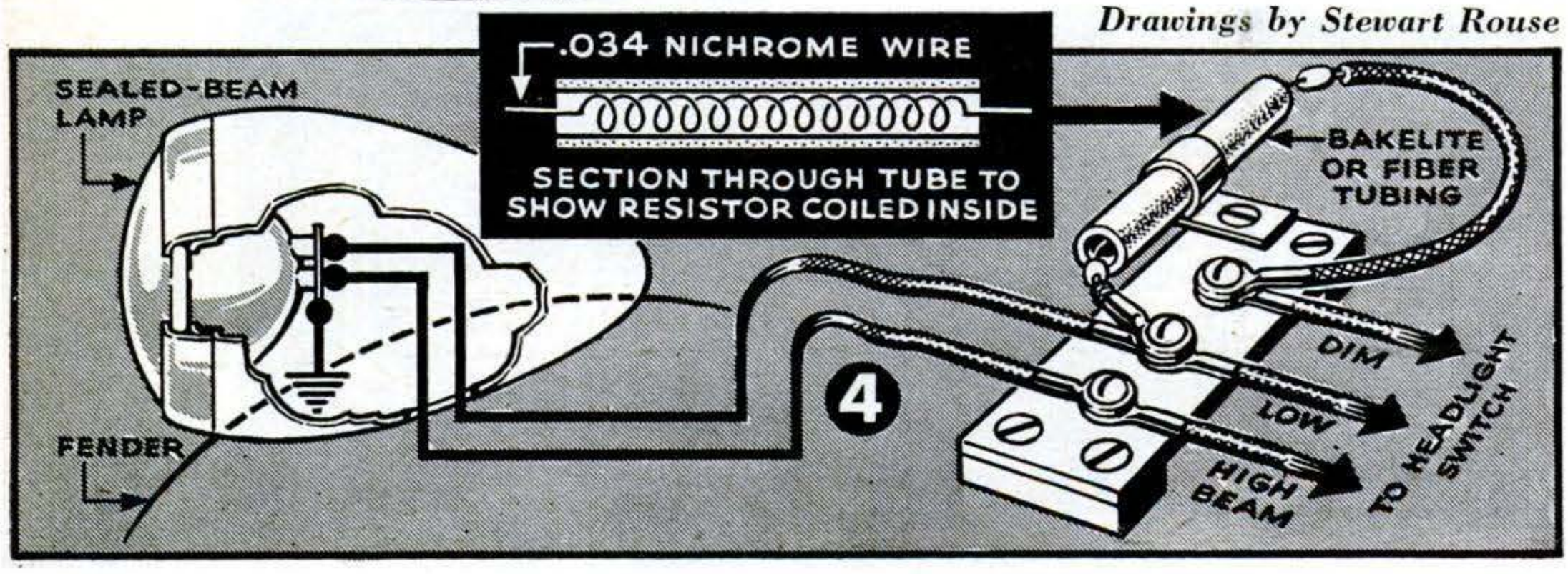
2. Vary the Voltage by Hand. When extra electrical accessories are installed, a problem always arises if the car lacks an automatic voltage control. If the generator is set to carry the extra load, it's apt to overcharge the battery when the load is off. As a solution, K. C. Anderson, Ames, Iowa, installed a manually operated field resistor rated at 100 watts, 5 ohms. The resistor was placed on the dash, and generator output can now be varied while driving.



3. Less Light on the Dash. If your car doesn't have a dash-light dimmer, a variable resistance switch from an old car heater will let you adjust the brilliance of the instrument-panel lights. J. R. Sisley, Seattle, makes the suggestion.

4. Parking Lamp Improvised. While installing several sealed-beam adapters, Henry J. Stauf, of Woodside, N. Y., found that the low beam could be dimmed for use as a parking lamp by placing a 1-ohm

Drawings by Stewart Rouse

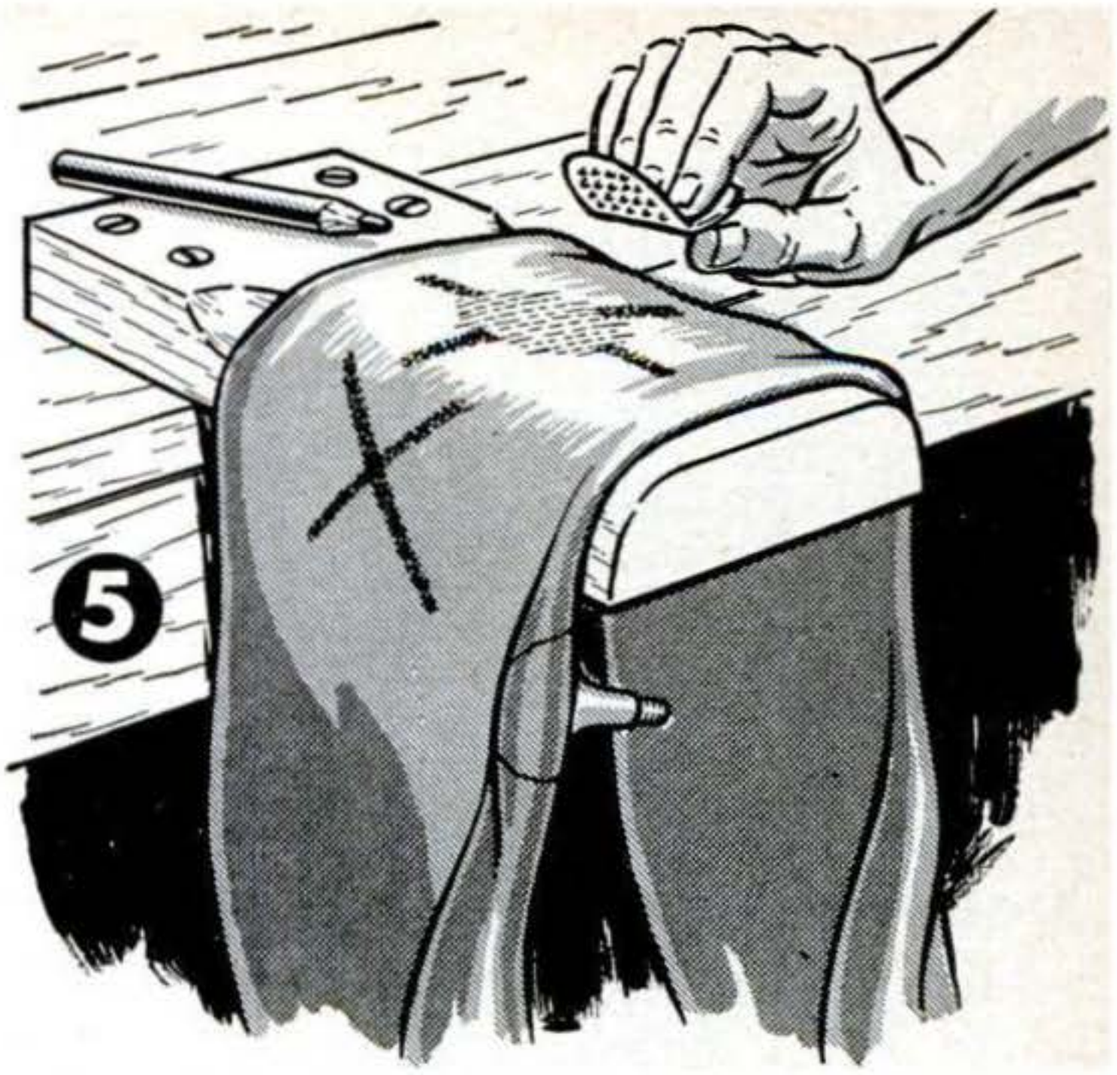


Copyrighted material

Model Garage

resistor across the dim and low beam connections from the light switch. He used .034″ Nichrome Ⓣ wire to make resistors.

5. X Marks the Puncture. In a tire shop where he once worked, writes Fred C. Daley, of Oklahoma City, an indelible pencil was used to mark tube punctures, two lines being crossed at the pinhole. Then, after the tube was buffed for patching, the ends of the lines pointed toward the pinhole.

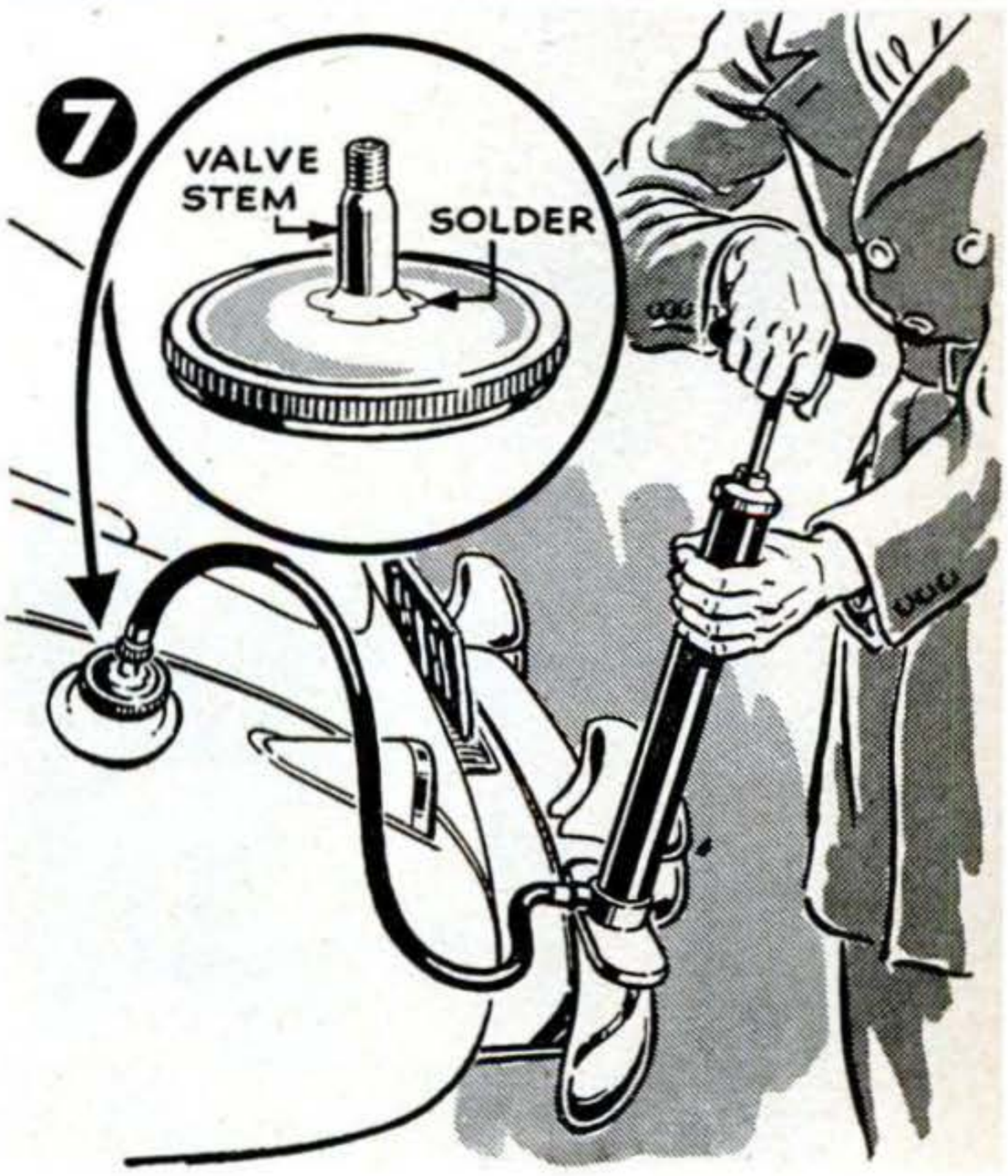


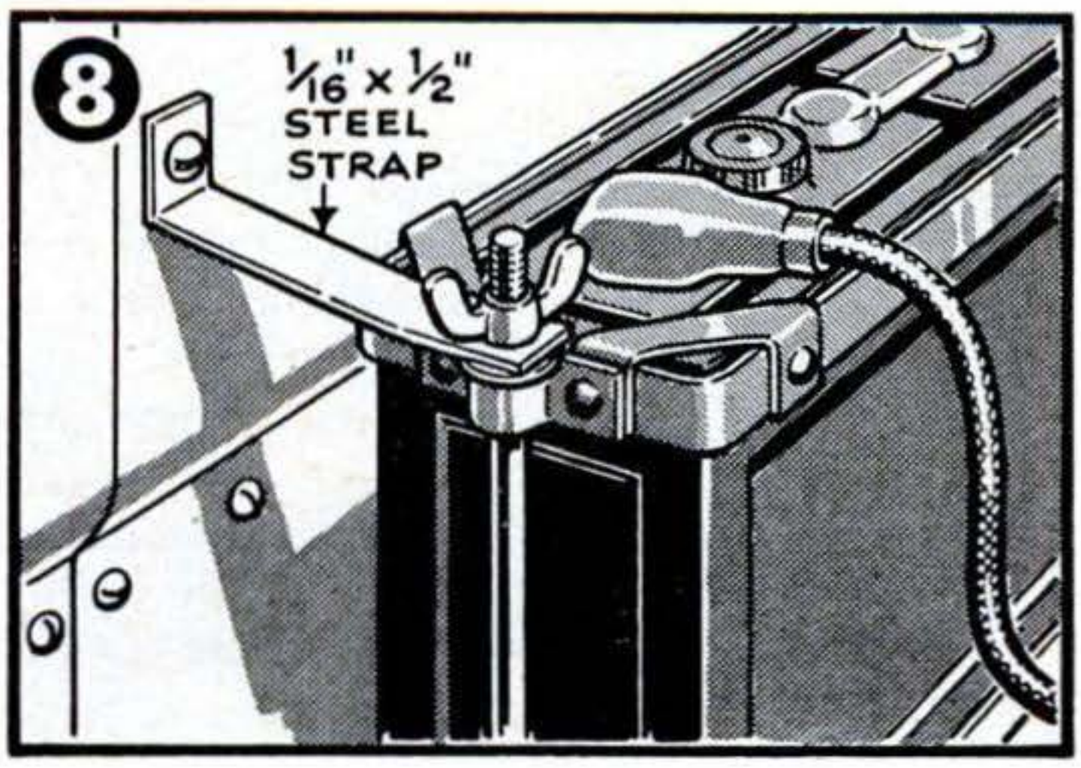
6. Aluminum Dresses Up Car. One reader has replaced scuffed and broken inside panels with sheet-aluminum ones, using sheet-metal screws. A little buffing gives a chromelike appearance.

7. Emergency Fuel Pump. If you believe in preparing for trouble before it occurs, here's an idea. Should your fuel pump go bad, a spare gas-tank cap with an inner-tube valve soldered to a hole drilled in its center will enable you to pump enough gas to the carburetor to reach a repair shop. Just a few strokes are enough for several miles, according to H. W. Mills, of Albion, Ill., who has found the idea practical.

8. Bracket Steadies Battery. Vibration, the enemy of any car battery, can be lessened in under-hood installations by bolting a strap-iron bracket to the fender apron and the battery hold-down bolt. The idea comes from Glenn A. Wagner, of Delmar, N. Y.

Gus Wilson





Copyrighted material

Builds Own Station Wagon

MOUNTED on a jeep chassis, this station-wagon body is the work of Bruce N. Thompson, of Seattle, Wash. The body was framed with hardwood and finished with birch paneling. Safety glass was used for all windows, and a full length upholstered seat in front increases the riding comfort. A scale model was built first.

A 14″ extension was bolted to the rear of the chassis, allowing a longer body and providing space for a rear gas tank. The spare tire is attached to the hinged tailgate so that when the latter is opened the tire drops out of the way. An old windshield was used for the top part of the rear door.

For trim on the sides, surplus aircraft tubing was sawed in half. This also conceals the body bolts.—MIKE CLARY.

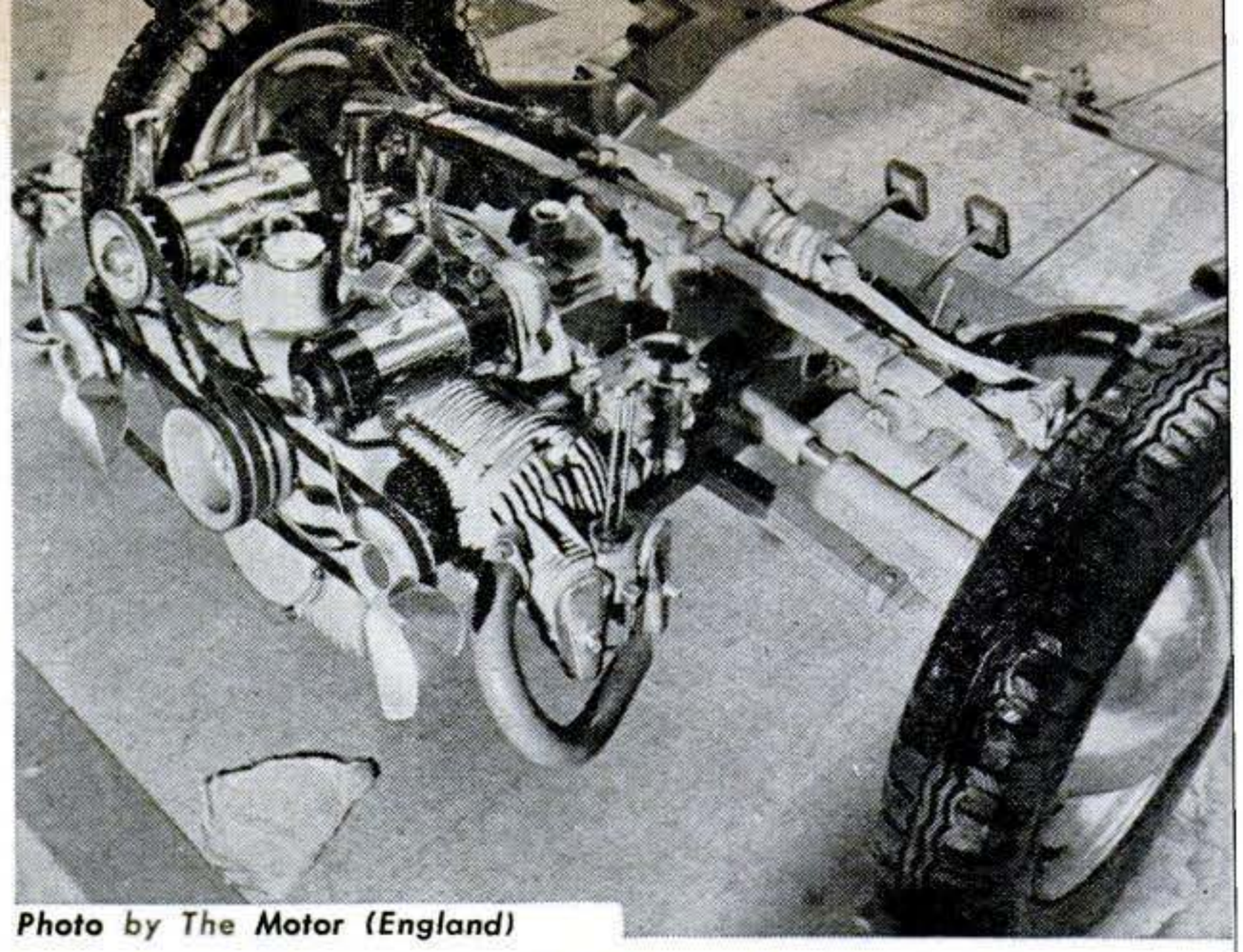


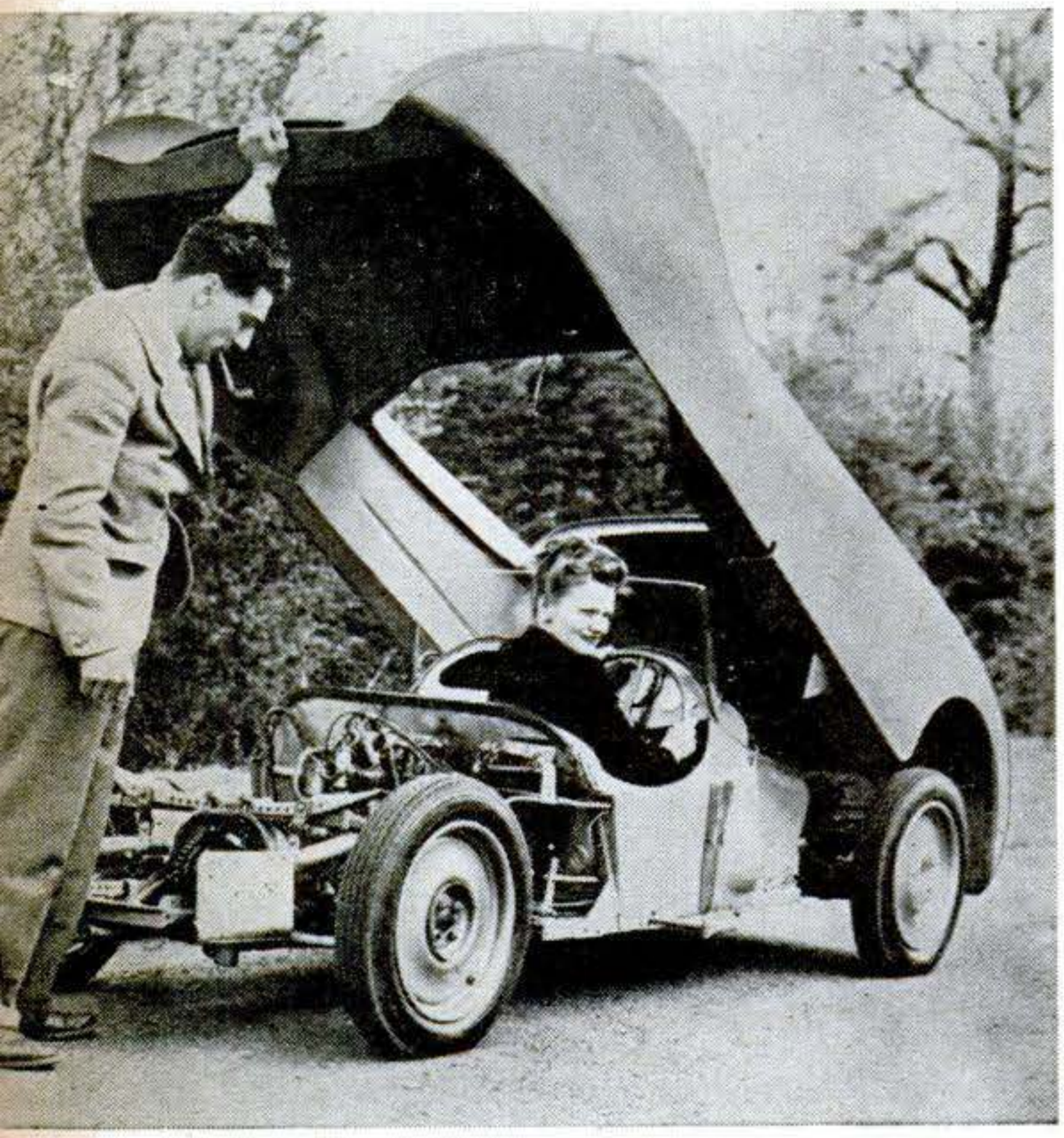
Photo by The Motor (England)

Engine Mounted Ahead of Axle

IN THE small French Dyna-Panhard car, the engine and four-speed transmission are located ahead of the axle and the driven front wheels, leaving the entire wheelbase available for passenger accommodation. The engine is a flat twin of 24 hp., air cooled by two fans placed in front.

Although the wheelbase is only 7′ and the tread 4′, the forward location of the engine and the lack of a propeller shaft make it possible to use a body that will carry four persons comfortably. The overall length of the car is 11′ 9″. Aluminum construction keeps the weight down to only a little more than 1,000 lb.

A similar motor-mounting arrangement is found in two other European cars, the Czech Skoda Minor and French Gregoire.



Body Lifts to Uncover Engine

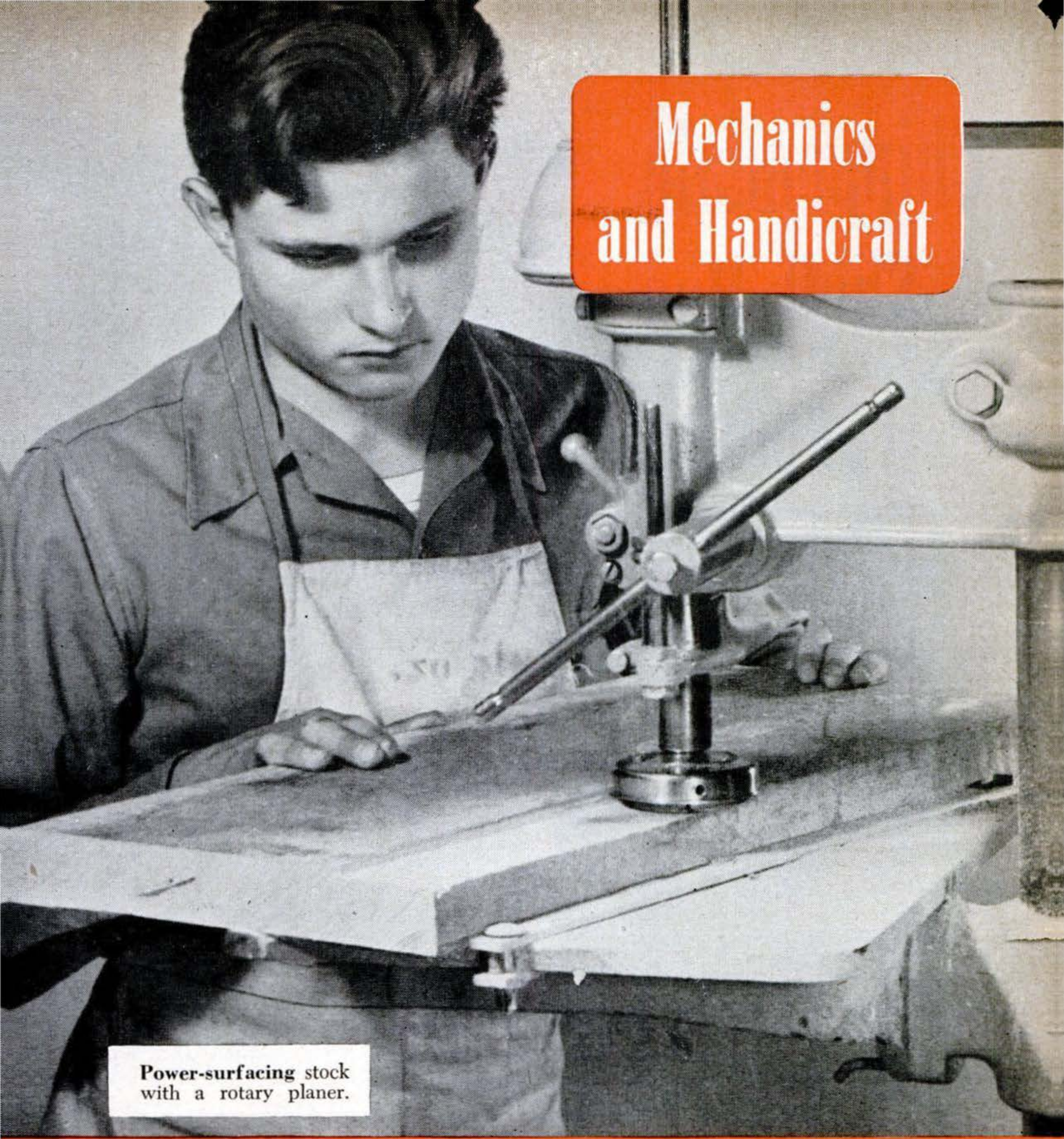
IF YOU should want to service the engine of a small British car, you'd have to lift the entire body, instead of just the hood. However, this would not be difficult, for the car is small and the streamlined body shell, hinged at the front, is made of lightweight materials. Release of one catch at the rear allows it to be raised.

The car is a Cooper Special, developed from a racing model that has turned in some good performances in British trials.

Powered by a two-cylinder motorcycle engine located at the rear, the car attains speeds of 75 to 80 m.p.h. and travels about 65 miles on a gallon of gasoline. There are three speeds forward and one in reverse, transverse springing is used on all wheels, and ahead of the two-person seat are found the fuel tank, spare wheel, and an air intake to help cool the rear engine.

Copyrighted material

Mechanics and Handicraft



Power-surfacing stock with a rotary planer.

Surfacing with Power Tools PAGE 198

Chippendale Wall Shelf PAGE 180

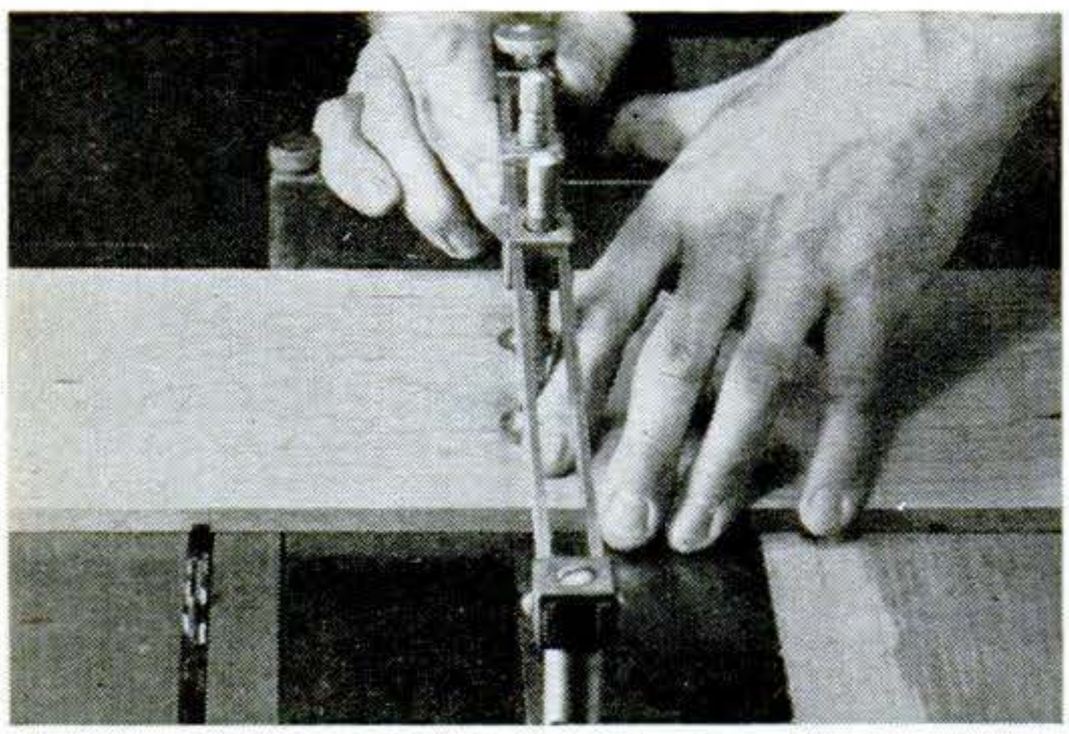
Magic with Neon Glow Lamps PAGE 192

Jigsaw Head for Hand Grinder PAGE 207

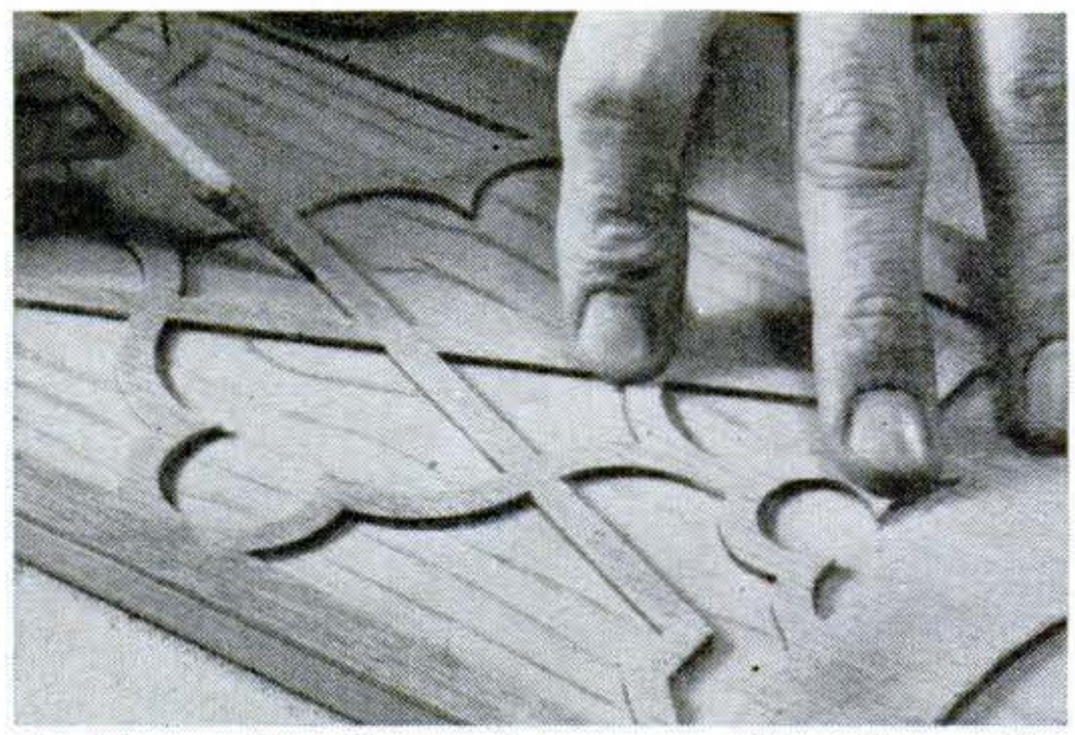
Short-Wave Converter Gets DX PAGE 218

Chippendale Shelf Has Veneered Drawers

By Glenn A. Wagner

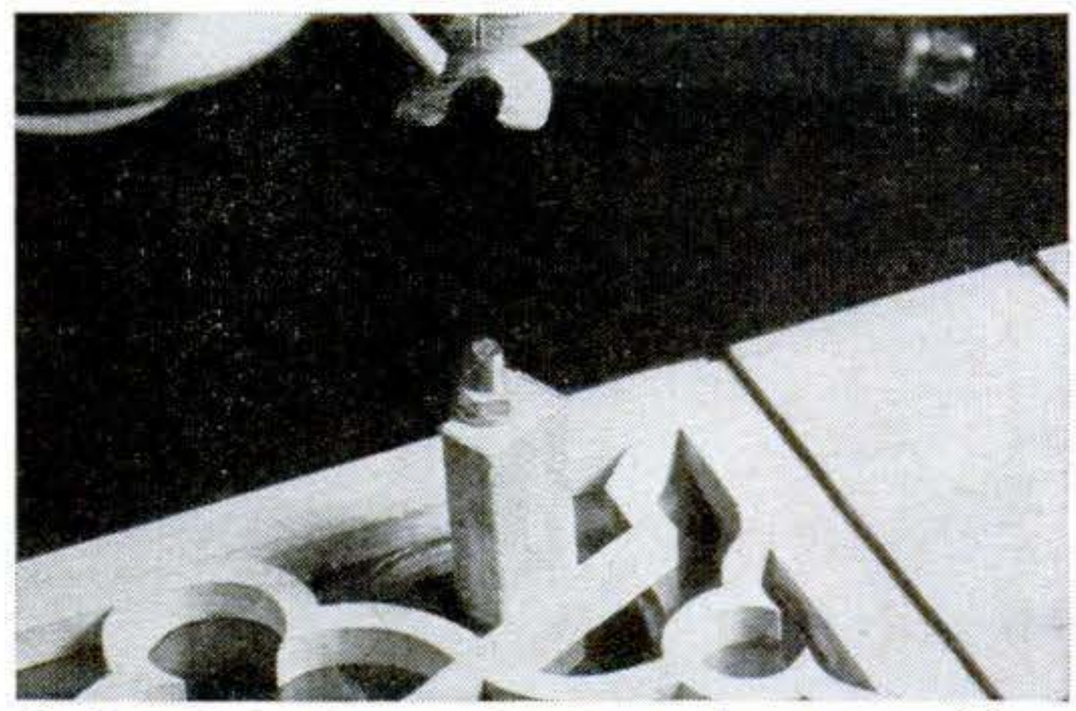


1. Cut ⅛″ by ¼″ dadoes in the sides and two bottom shelves with a circular saw, as above, or with a ¼″ bit in a hand router. Lay out the dadoes with the pieces clamped together.



2. Trace the fretwork pattern directly on the side pieces with a wood or cardboard template. Before doing this, it is advisable to sand all surfaces of the sides and the four shelves.

3. Bore holes in the waste to allow insertion of the blade, and, in sawing, split the line. Heavy paper attached to the underside of each piece with rubber cement will prevent chipping.



4. Sand the fretwork edges, being careful to get into corners. After a final sanding of all faces, glue together the sides, shelves, and the partition. For the drawers, see page 182.

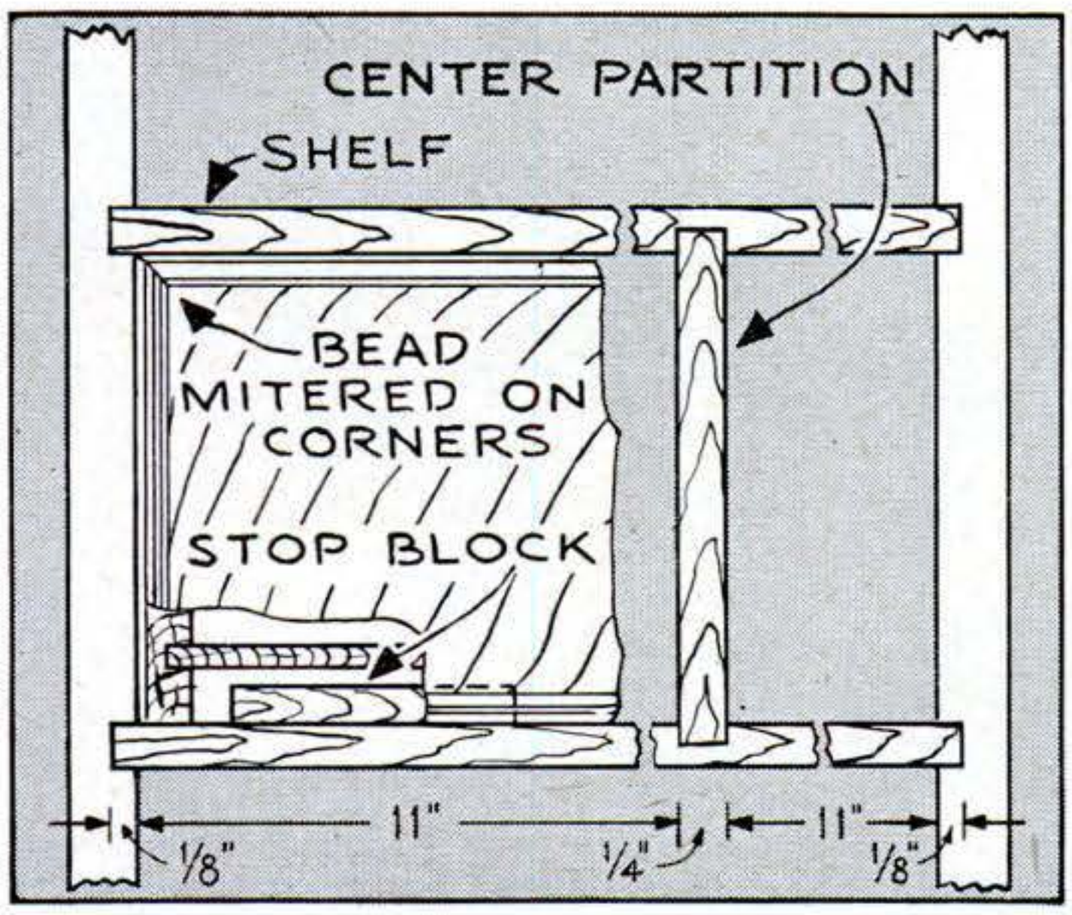
Copyrighted material

MOUNTED above a spinet or slant-top desk, this wall rack will be a period piece you can be proud of. Since the fretwork pattern was taken from Chippendale's book of design, mahogany is the most appropriate wood to use, although cherry will serve very well. Solid wood, rather than plywood, is suggested, but in either case the drawer fronts should be veneered with crotch mahogany and edged with a decorative bead strip.

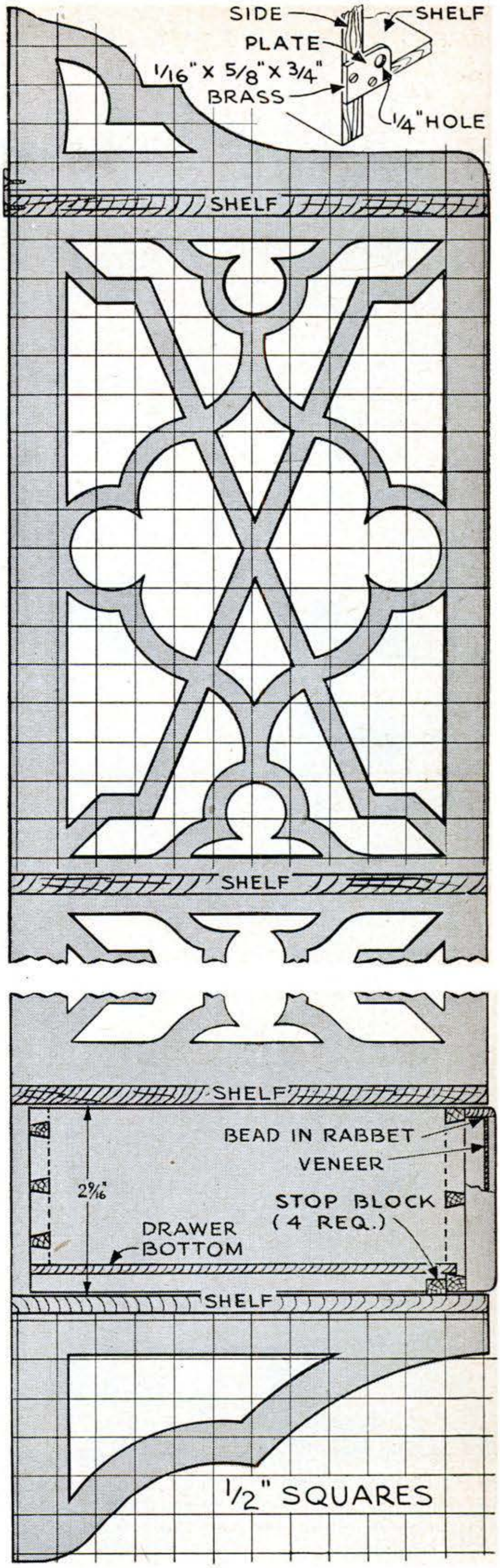
To lay out the dovetails, set a marking gauge with a knife-edge pin to the thickness of a side and then scribe lines on each side of both ends of the back and sidepieces and on the back and end of the drawer fronts. A bevel square set for a slope of 1″ in 6″ may be used in marking the sides of the tails. After cutting the tails in a sidepiece, this may then be used as a template to scribe lines for the pins on the end of the mating piece.

When the rack is complete and thoroughly sanded, sponge with water to raise any loose wood fibers. Sand again when dry, apply stain, allow to dry, apply a coat of linseed oil and turpentine, half and half, and allow to dry for several days. This treatment will give the wood a rich color. Next, a very thin coat of orange shellac may be applied, followed by two coats of rubbing varnish, each coat being sanded smooth before the next is applied. As the final step, rub the last coat with pumice stone and lemon oil, or apply lemon-oil furniture polish and rub down with rottenstone and oil. Use a felt block for the rubbing.

Finally, attach two brass pulls to the drawers and make and attach two hanger plates as indicated in the drawing.



The two drawers of the rack are separated by a partition dadoed between the bottom shelves.

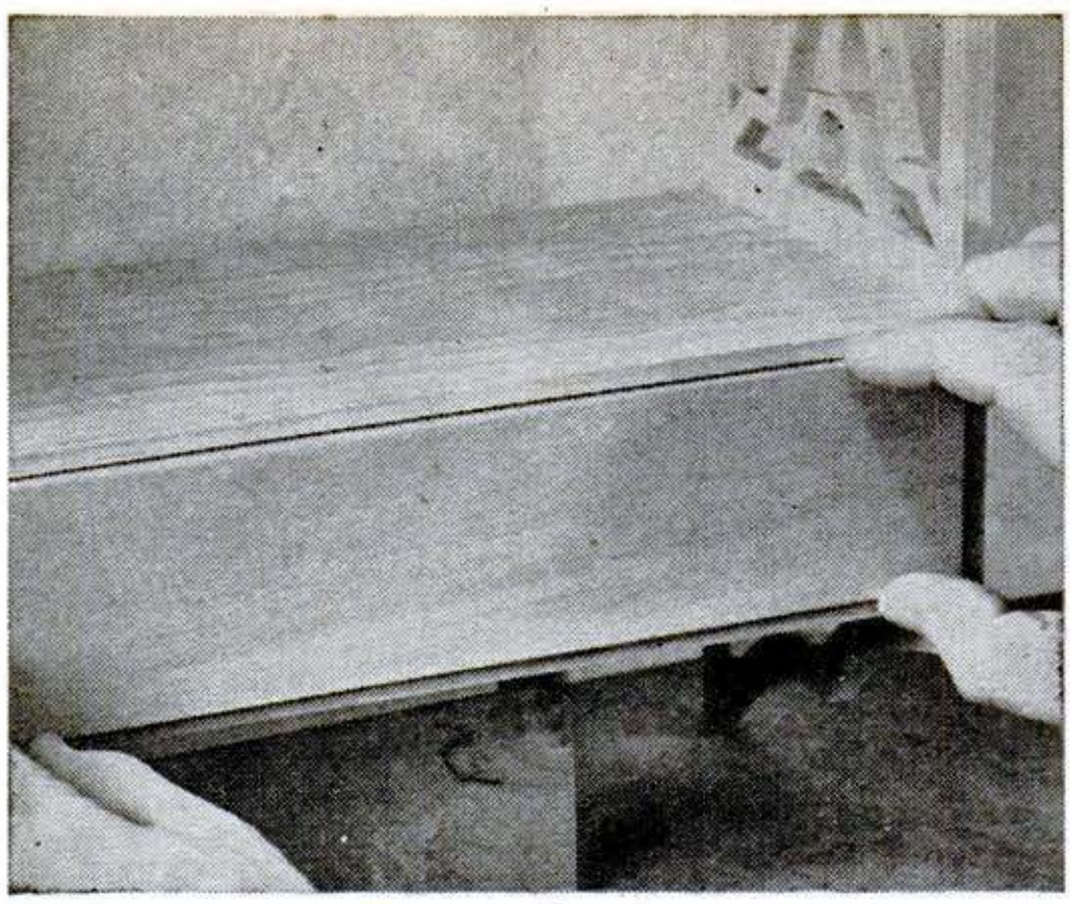


Copyrighted material

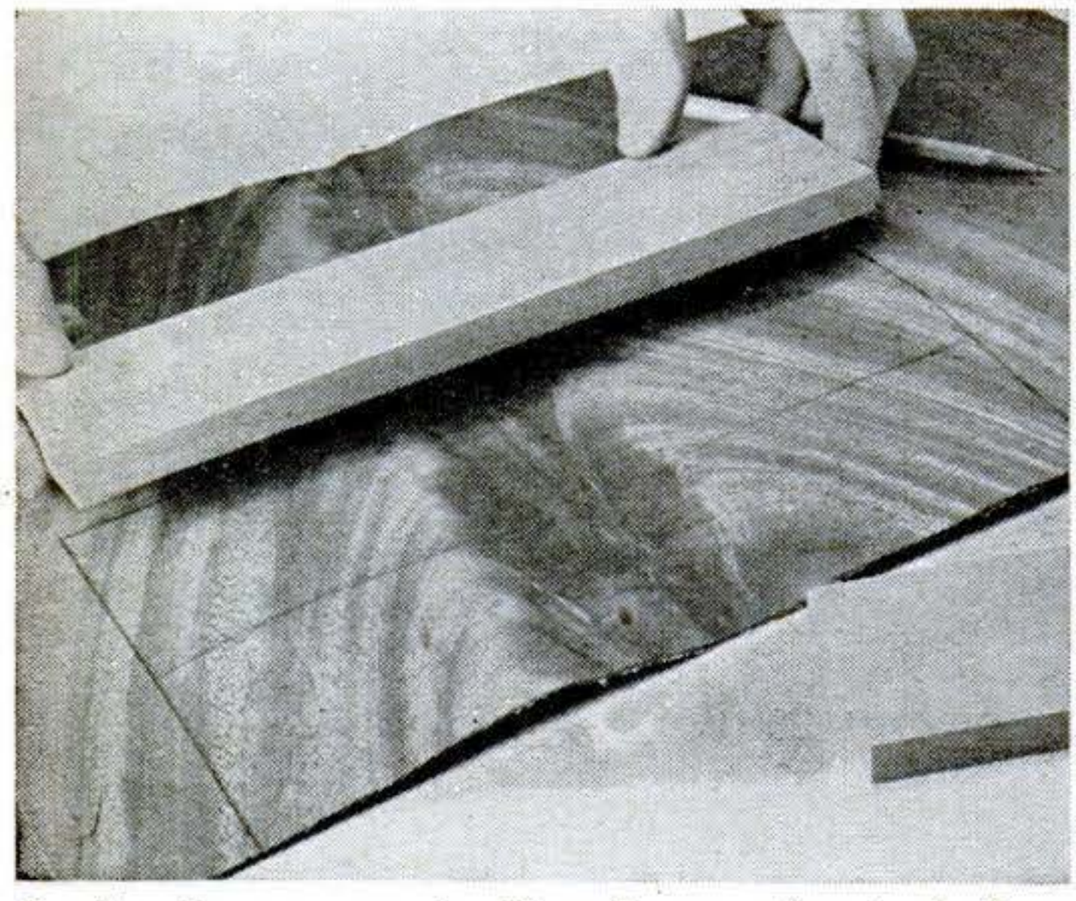
LIST OF MATERIALS

2 sides ⅜" by 6¼" by 27½".
4 shelves ¼" by 6¼" by 22½".
1 center strip ¼" by 6¼" by 2 13/16".
2 drawer fronts ½" by 2½" by 11".
2 drawer backs ¼" by 2¼" by 11".
4 drawer sides ¼" by 2½" by 5¾".
2 drawer bottoms ⅛" by 5⅝" by 10¾" plywood.
2 pieces veneer to fit drawer fronts.
4 stop blocks 3/16" by ¼" by 1½".
5/32" by 13/32" beading about 60" long.
2 brass drawer pulls.
2 brass hanger plates.

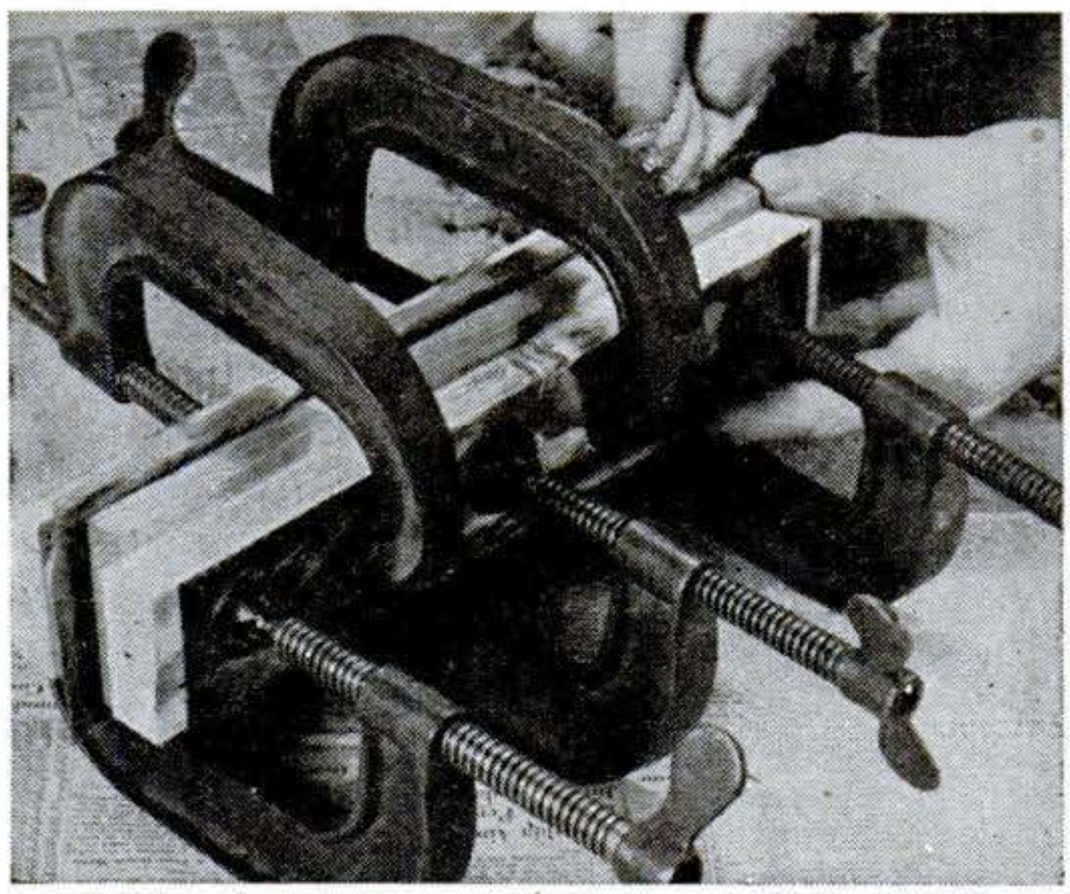
(All dimensions are finished sizes).



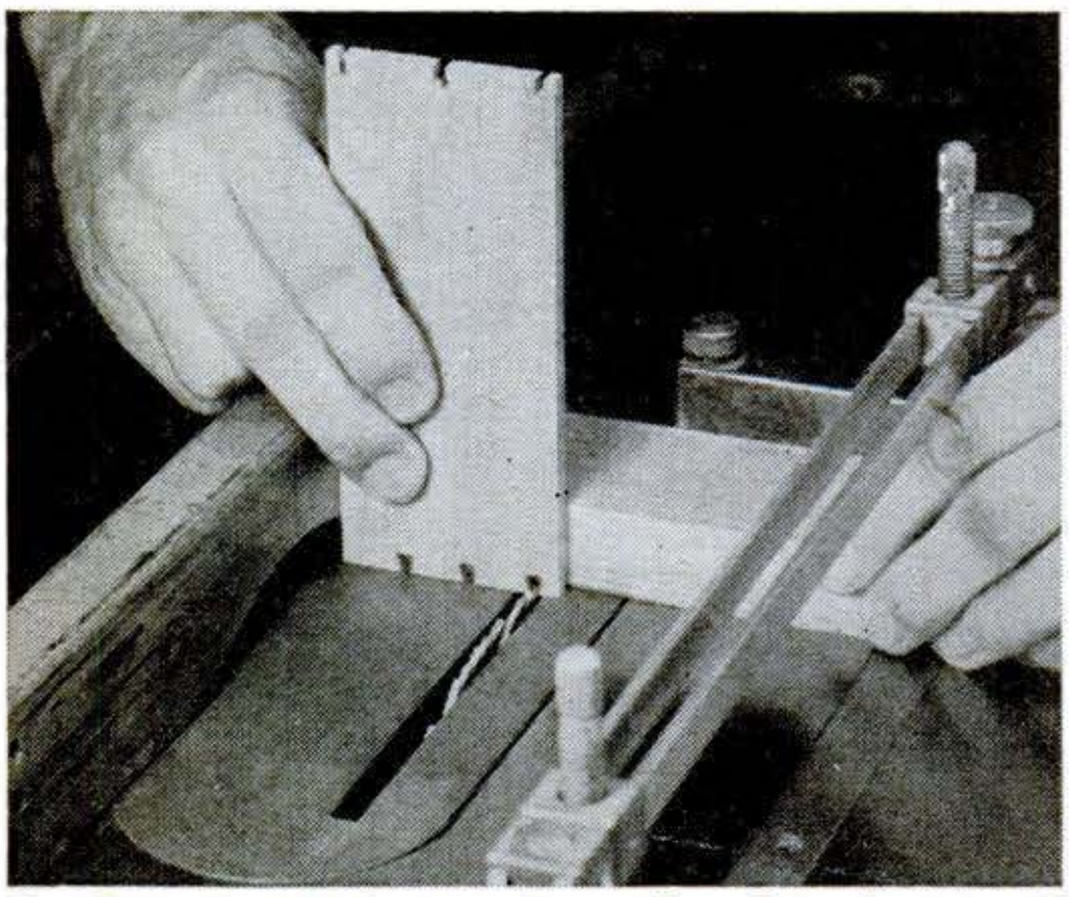
5. Begin the drawers by fitting fronts to the openings, leaving 1/32" clearance at the top and one end. Make backs that match the fronts and cut the endpieces to the same height.



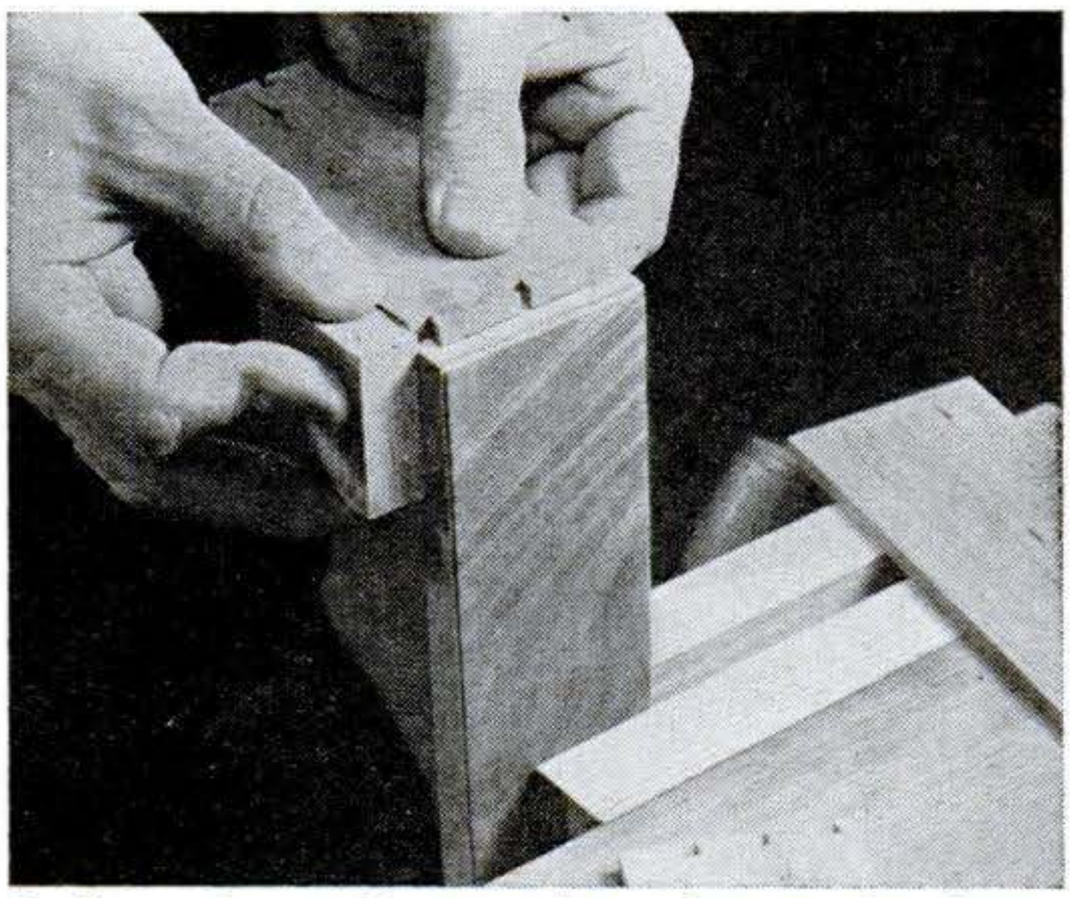
6. Apply veneer to the drawer fronts before cutting the joints. Center the veneer pattern on the front, making allowance for trimming. Wet the veneer before gluing it in place.



7. Clamp the drawer fronts face to face with several layers of paper between the two pieces of veneer. When the glue has dried, trim the edges of the veneer flush with the fronts.

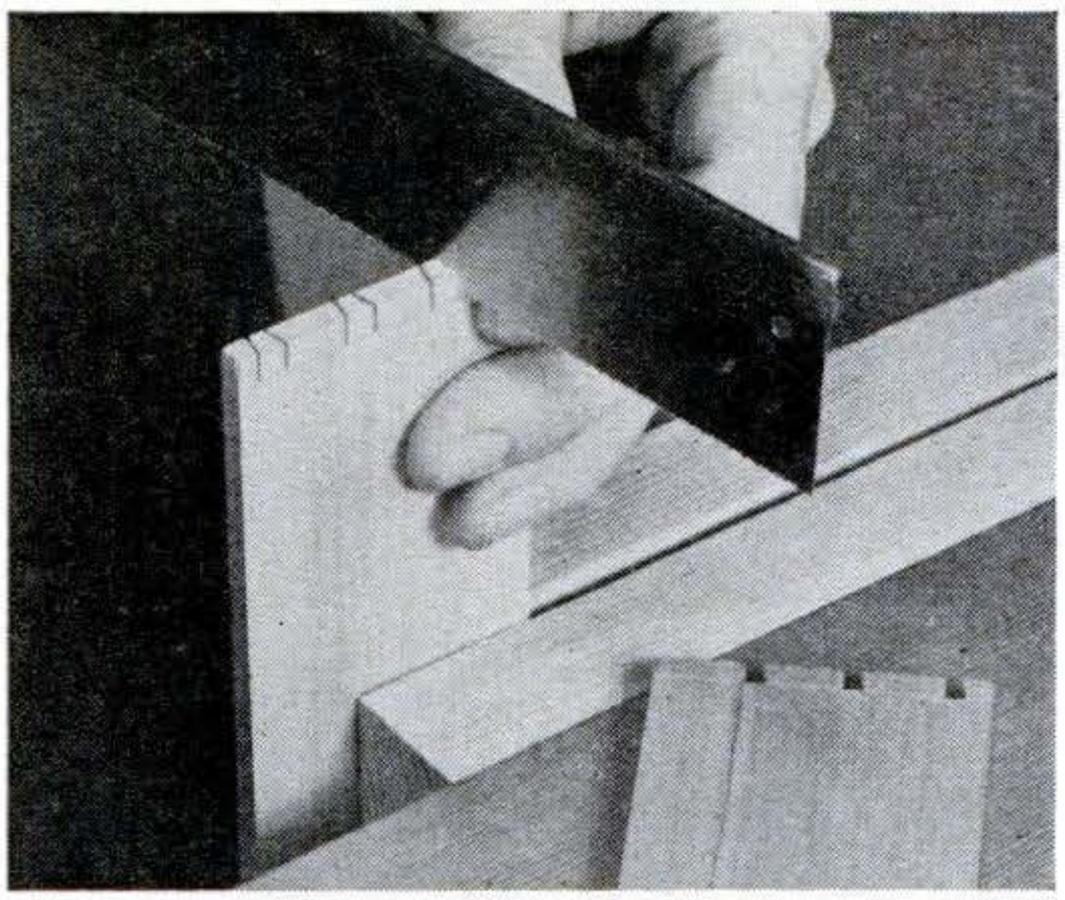


8. Cut dovetails in the sides first—by hand or with the circular-saw table tilted 10 deg. Good layout requires a sharp knife and a gauge with knife-edge pin. See the text for details.

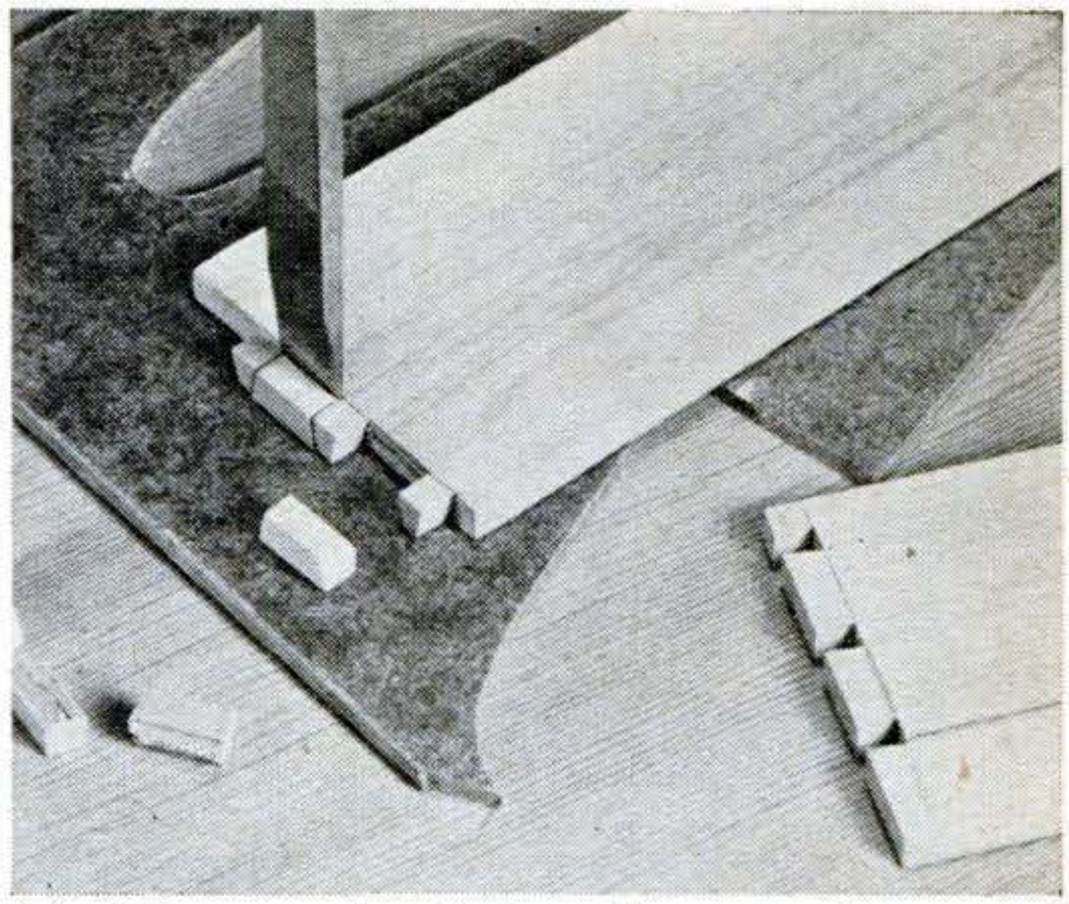


9. Lap dovetails join the sides to the front. Lay out the pins on each end of the front by lining up a side and front and scribing with a sharp knife. Number all the mating joints.

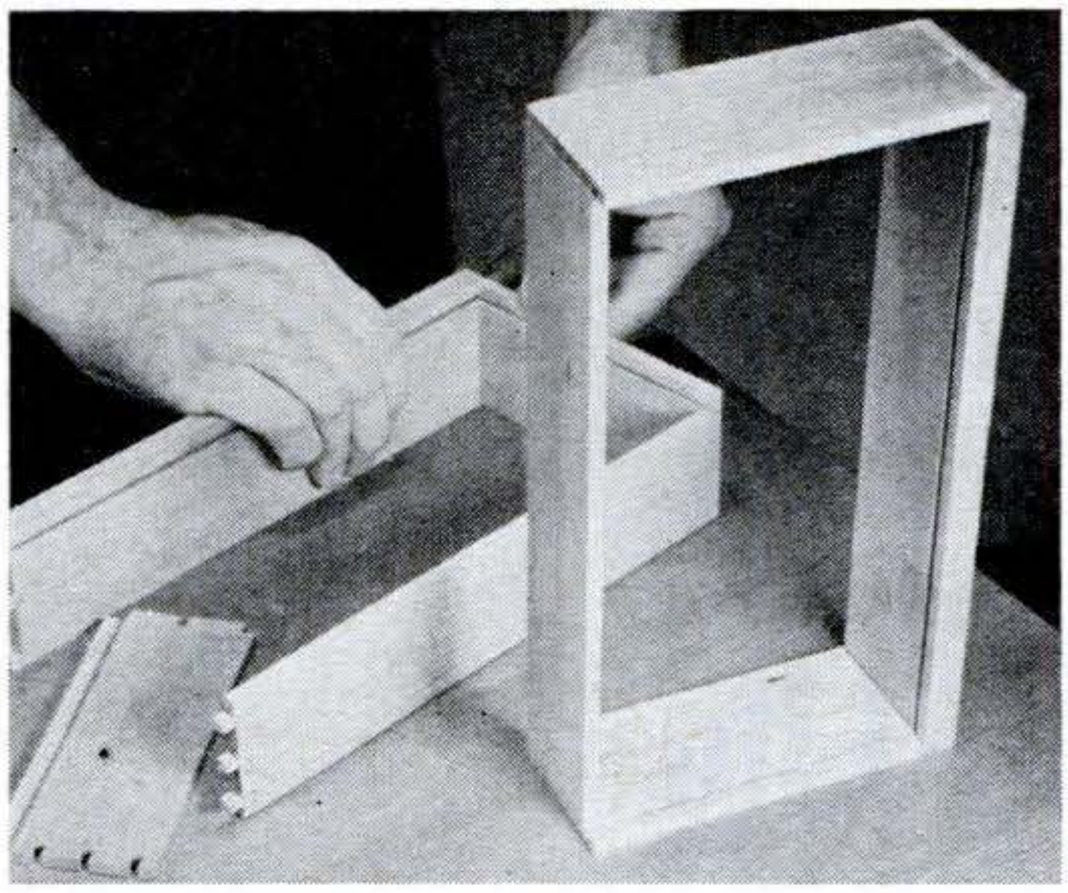
Copyrighted material



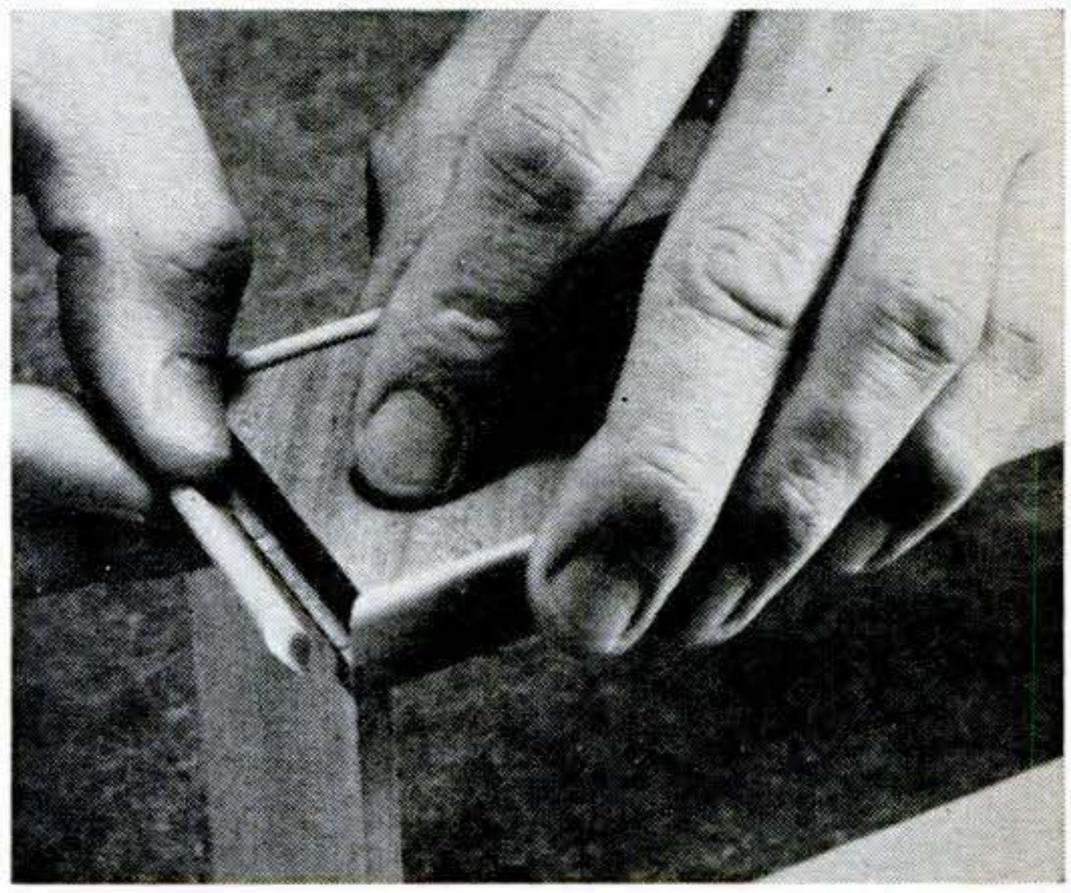
10. Back joints are through dovetails and may be easily cut with a dovetail saw after clamping the work in a vise. Be careful to keep the kerf in the waste and split the scribed lines.



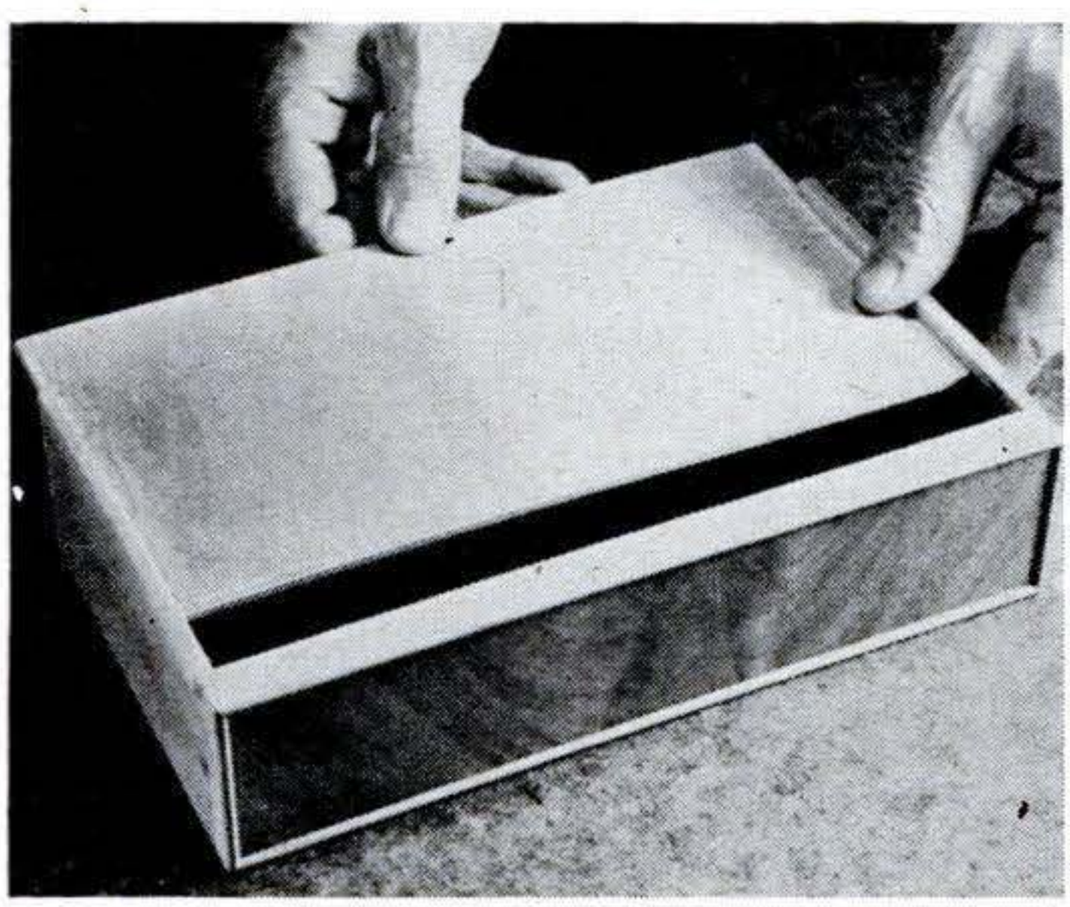
11. Waste is chiseled out between the pins of the back pieces in this way. In the front, cut the pin lines by operating a saw at an angle. Then chisel out, working from the end and back.



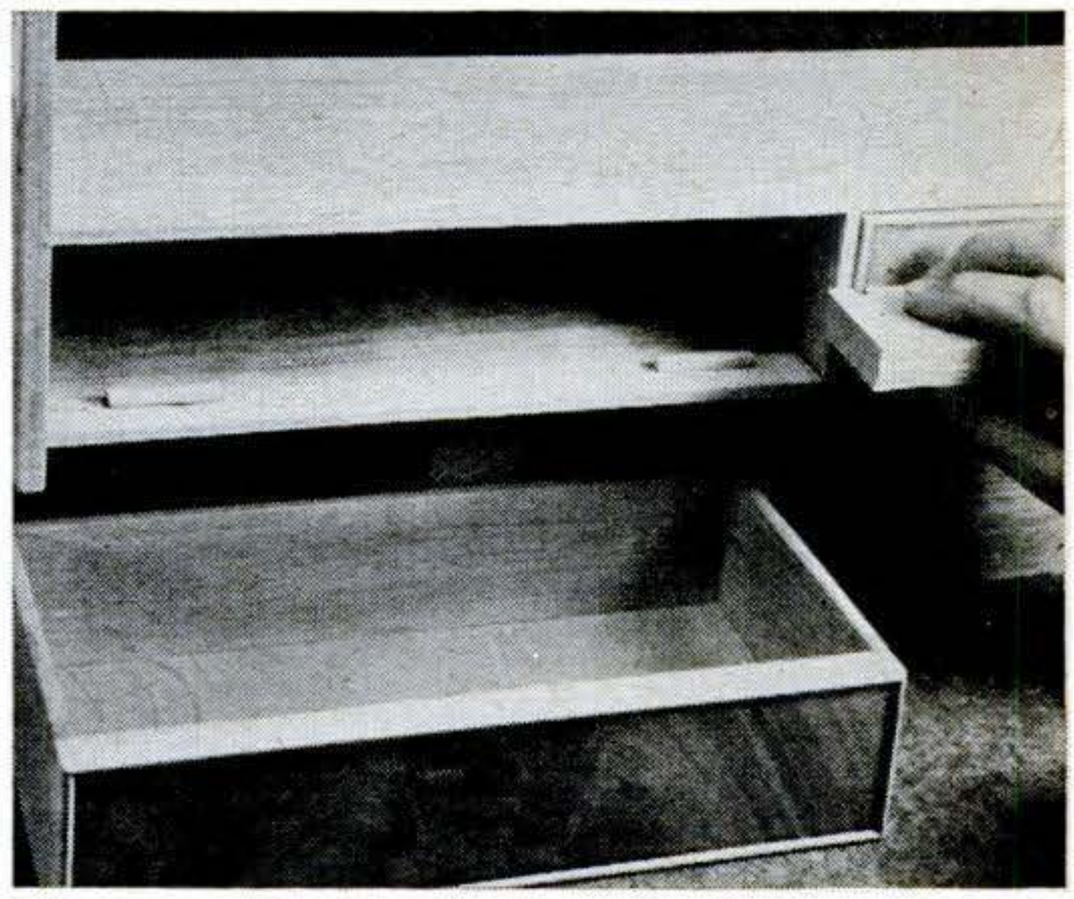
12. A trial assembly will show if all joints fit. Then cut a ⅛" groove for the bottom in the sides and front, and rip off the lower edge of the back so the bottom can be inserted.



13. Beaded edges go around the veneered front. Cut rabbets to suit this molding and fit it to the drawer with miter joints. Sand the face of the veneer and then glue the molding in place.



14. Cut drawer bottoms from ⅛" plywood and fasten them in place with a few nails driven into the edge of the back piece after all of the dovetail joints have been glued.



15. Stop blocks glued to the bottom shelf in the position shown complete the construction job. A notched gauge block used as above will enable you to set the drawer faces flush. END

Copyrighted material

A little padding, a new slip cover, and a salvaged auto seat becomes a comfortable settee.

Converting Automobile Seats into Easy Chairs

By selecting appropriate upholstery, you can make these chairs fit period or modern rooms.

By Fern Fowler

Photos by Bruno Stein

DOES your wife ever clamor to "get into the act"? Well, here's her chance—a job that calls for sewing as well as sawing. Aside from saving yourselves a good deal of money, transforming auto seats into easy chairs will give you decorative and—perhaps more important—exceptionally comfortable pieces. Auto makers build their seats to ease rough riding and to take a lot of wear; the car seats you pick up at the auto graveyard are likely to have more spring life, comfort, and ruggedness left in them than you'll find in many new chairs. You should be able to find suitable ones at any wrecking yard.

The settee shown here grew out of the front seat of a sedan, the chairs from the front seats of a coach. If possible, obtain one-piece seats that are a single rigid unit,

Copyrighted material

but if these aren't available you can use the type in which the back is hinged to the rear edge of the seat. Simply screw metal plates over the hinges to give rigidity to the two parts. Chairs should be aired, brushed thoroughly, and scrubbed with furniture shampoo cleaner.

The four uprights of each chair are made of two-by-twos cut so that seat height is about 18″. At each corner of the bottom of the seat frames there is a 5/16″–18 threaded hole through which the chairs were once bolted to the car floor. A 5/16″ by 4″ lag screw was driven into the top of each wooden upright, the head cut off, and the projecting shank threaded with a 5/16″–18 die.

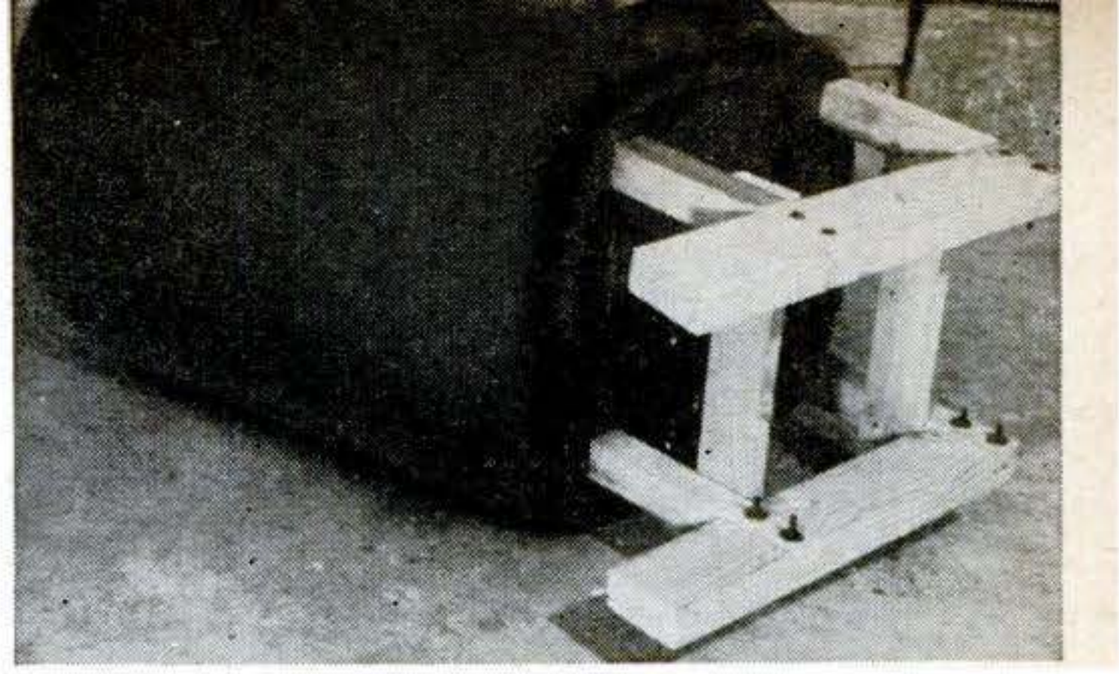
The legs were screwed into position and their lower ends half-lapped and bolted to two-by-four base runners as shown. These must be made long enough (about 20″) so that the chair cannot tip backward. Braces are nailed to the legs above the runners. Construction of the settee follows the same plan except that six legs are used and the runners are about 4″ longer.

Assuming that this furniture is being built as a husband-and-wife job, the man will have been doing the work described while the little lady sat around sharpening her upholstery needles. At this point the home team takes over. The first chore is to make sure that you don't build in a moth's nest. If the original upholstery is made of wool, you can douse it with germicide or, preferably, remove the covering.

Next, you will want to take out some of the slope (from A to B in the center photo at the right), build up the areas marked C and D, and also the space from E to F. Lay upholsterer's moss on evenly until the proper contours are obtained, add a smooth layer of cotton padding over the whole new form, and cover the chair with heavy muslin —sugar sacks were used here. The cloth was put on as each part of the padding was applied, and the seams were hand sewn with heavy cord and a darning needle.

To improve the contour at the front and set off the flounce, cording was inserted in the slip-cover seam along D. A heavy cord was also nailed to the bottom of the original seat at D, as shown at the right.

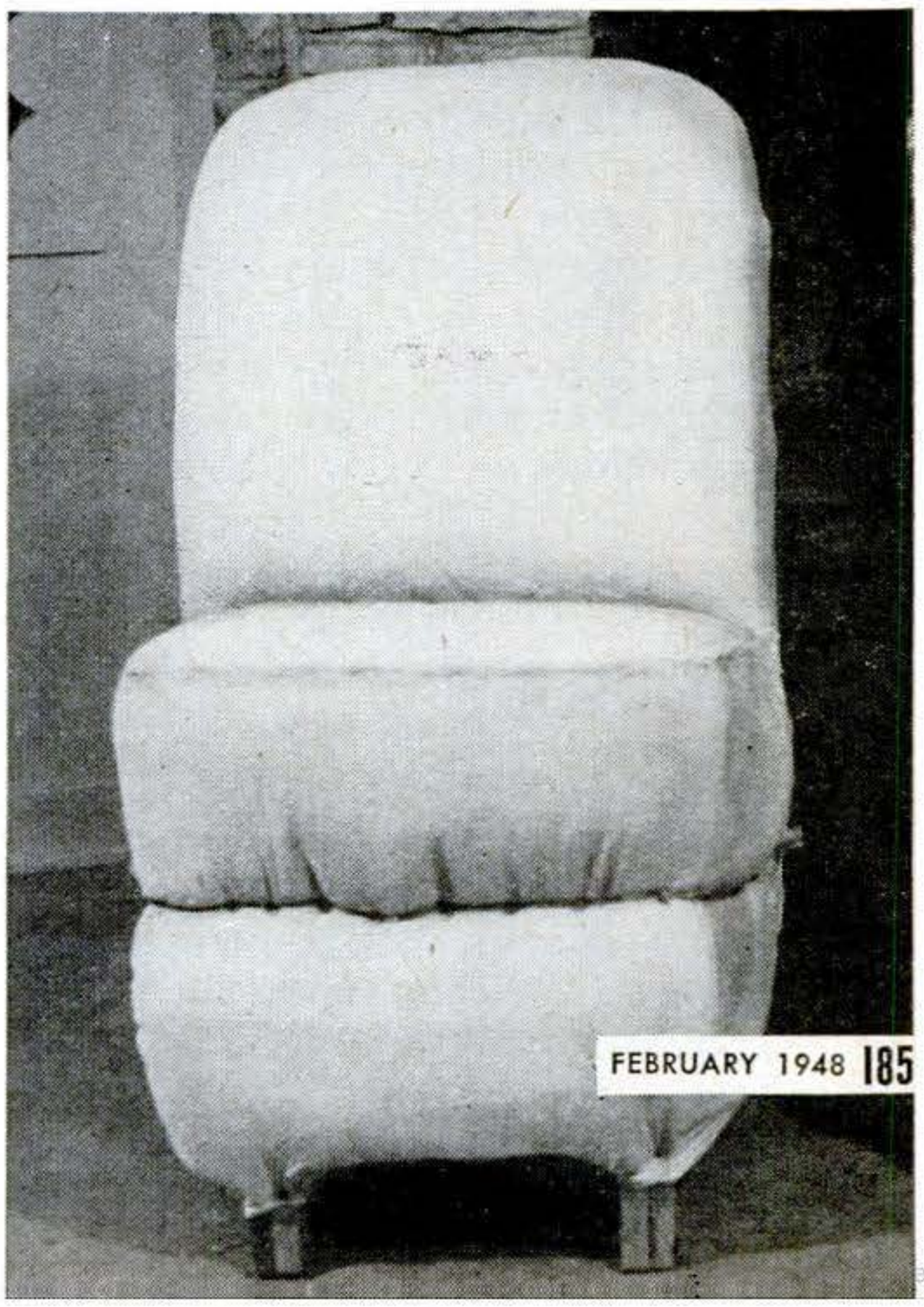
The slip cover is made in the usual way. Car seats, even when repadded, are so shaped that no opening need be left for putting on the covers. The back panel is made long enough so that it can be tacked to the base at F to secure the cover.

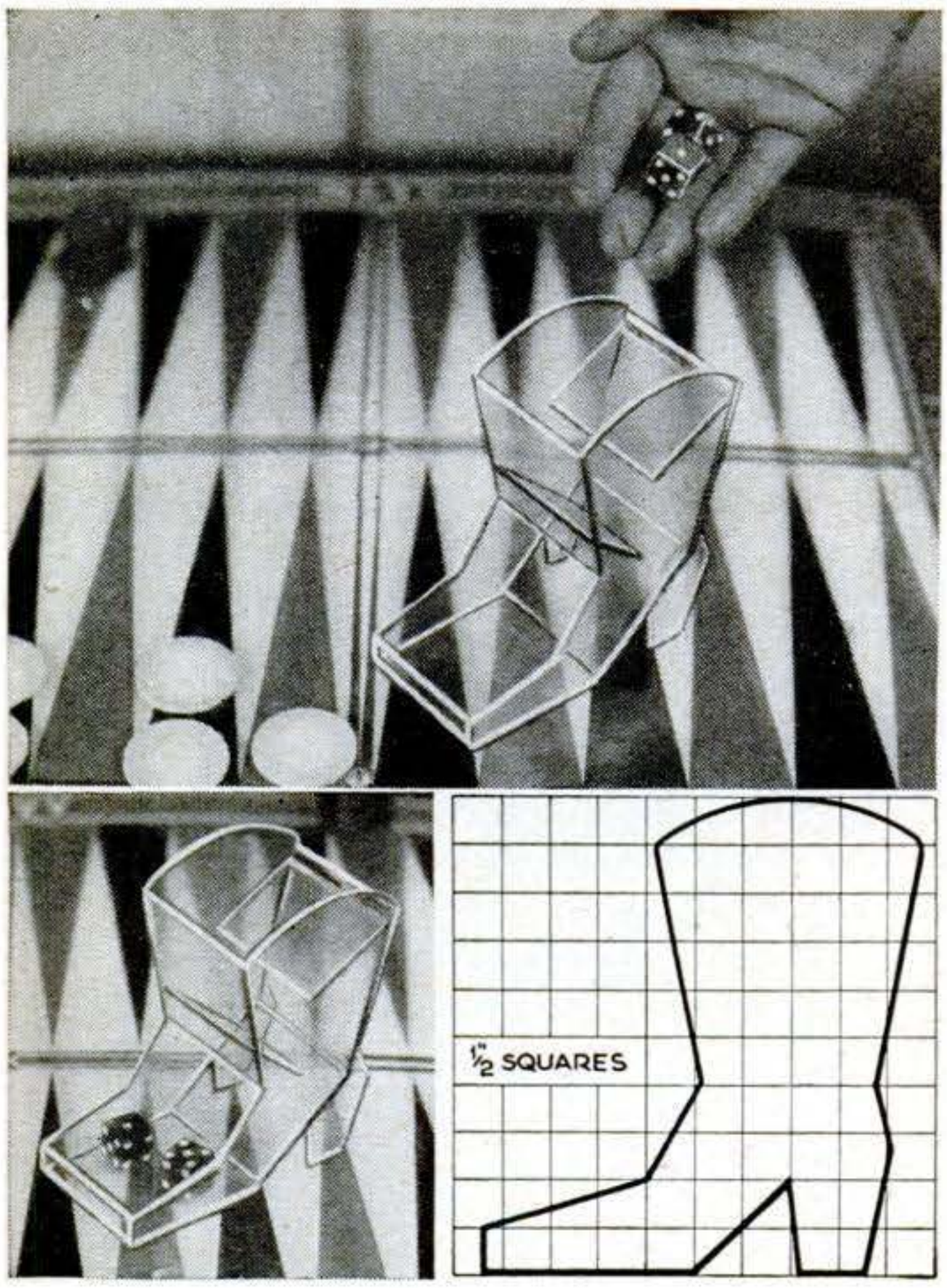


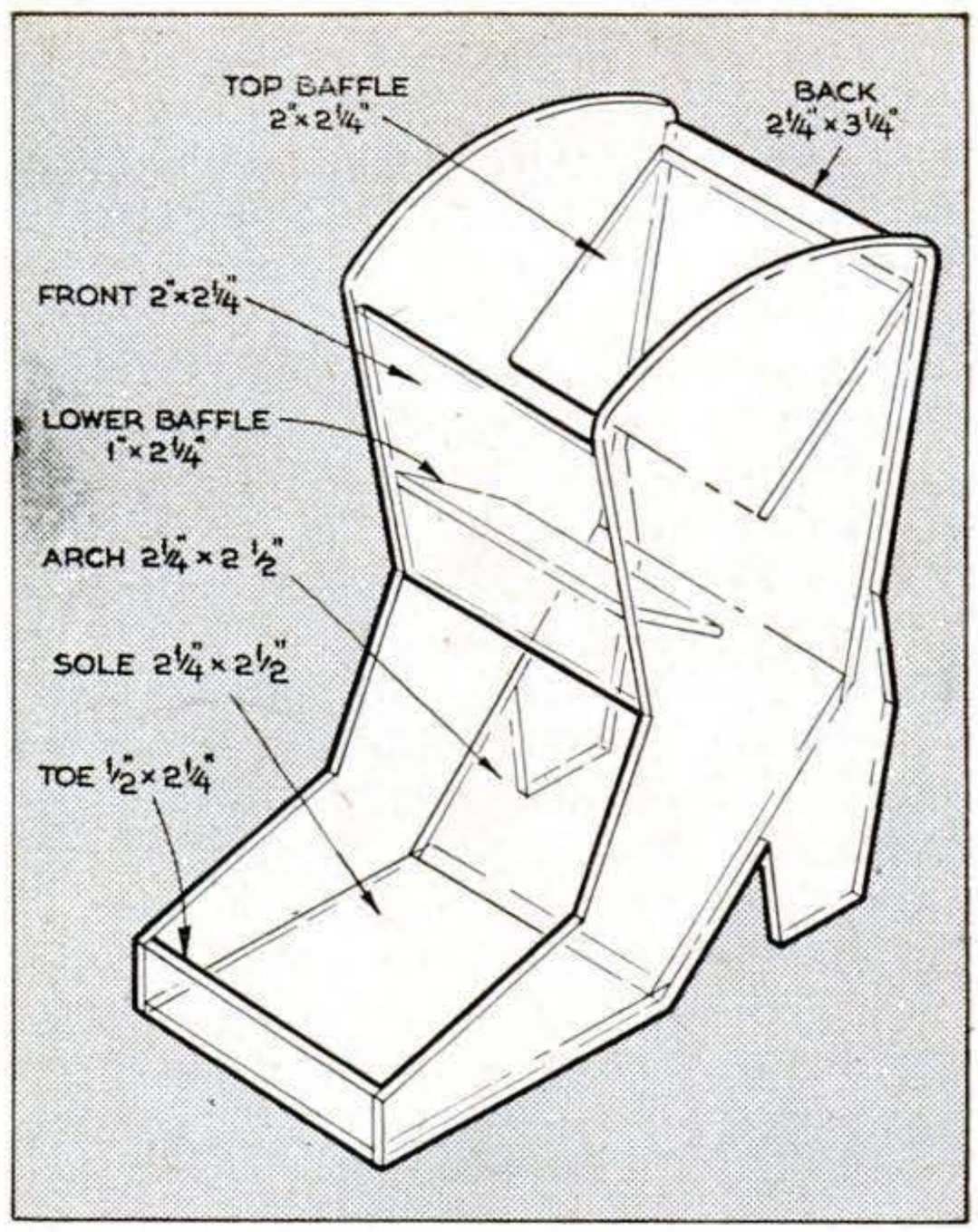
Base runners add both stability and pleasing proportions; these were cut to a length of 19½″.

Car seats slope more than regular chairs. The dotted lines show where to add extra padding.

Covered with heavy muslin, the chair is ready for upholstery or slip covers of your choice.







Use these dimensions for dice up to ½" cube; for larger sizes increase them all in proportion.

Plastic Dice Boot Shakes 'Em Up

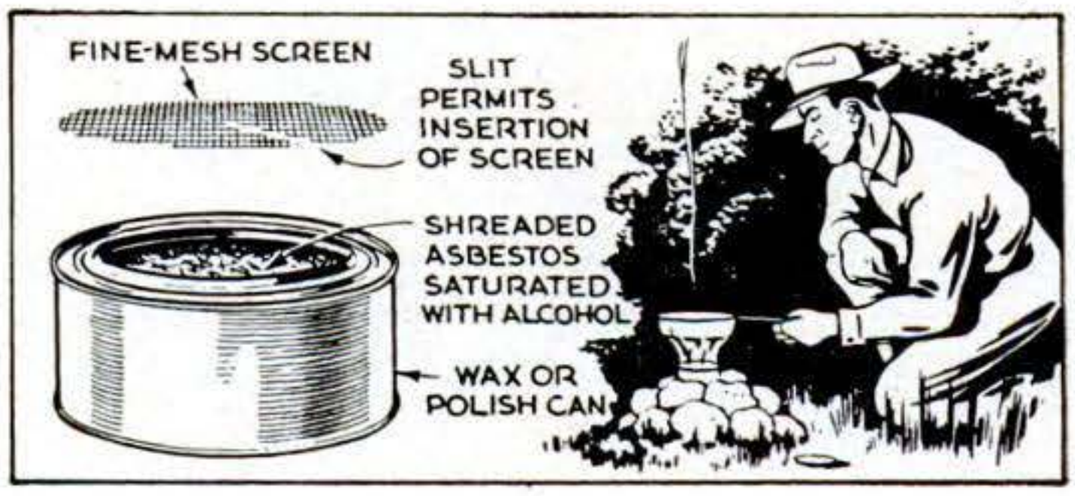
YOU can add a kick to your dice games with this handsome and serviceable boot, and it is simple enough for your first adventure with plastic. The dimensions given above are large enough to handle dice up to the ½" size. Any plastic of ⅛" thickness is suitable, but transparent stock—either clear or colored—will allow you to watch the eccentric movements of the fateful cubes. For this size, 1 sq. ft. is ample; larger sizes will take proportionately more. Dice are dropped in the top, shaken by the baffles, and come to rest in the open toe.

Enlarge the outline of the side to full size and trace it off onto the plastic. Jigsaw two pieces to this pattern, clamp them together, and file the edges so that they are identical. All the remaining pieces will be cut from strips 2¼" wide. Clamp and file them so that the edges are square and of exactly the same width.

Attach the center pieces to one of the sides with cellulose or plastic cement. Use a small square to make sure that they are all perpendicular. File the necessary bevels on each strip as you fit it into place. The one piece that will need special care is the arch, since the bevel must have the right angle at both ends if it is to fit properly. Before the adhesive has had time to set, put the other side piece in place and make whatever adjustments are necessary to square off the unit. If you prefer, a small piece of felt may be glued to the inside of the arch and sole to give the rattling dice a quieter background.—BUDD SALSIG.

Alcohol-Saturated Asbestos Provides Fast Fire

THOUGH firewood may be wet or snow-covered, the outdoorsman who has taken along one or more of these refillable "canned kitchens" may make himself a warm drink or meal in short order. Shielded from the wind with a couple of stones, the can will provide quick, clean heat. Replacing the lid kills the fire.—C. L. MEEHAN.



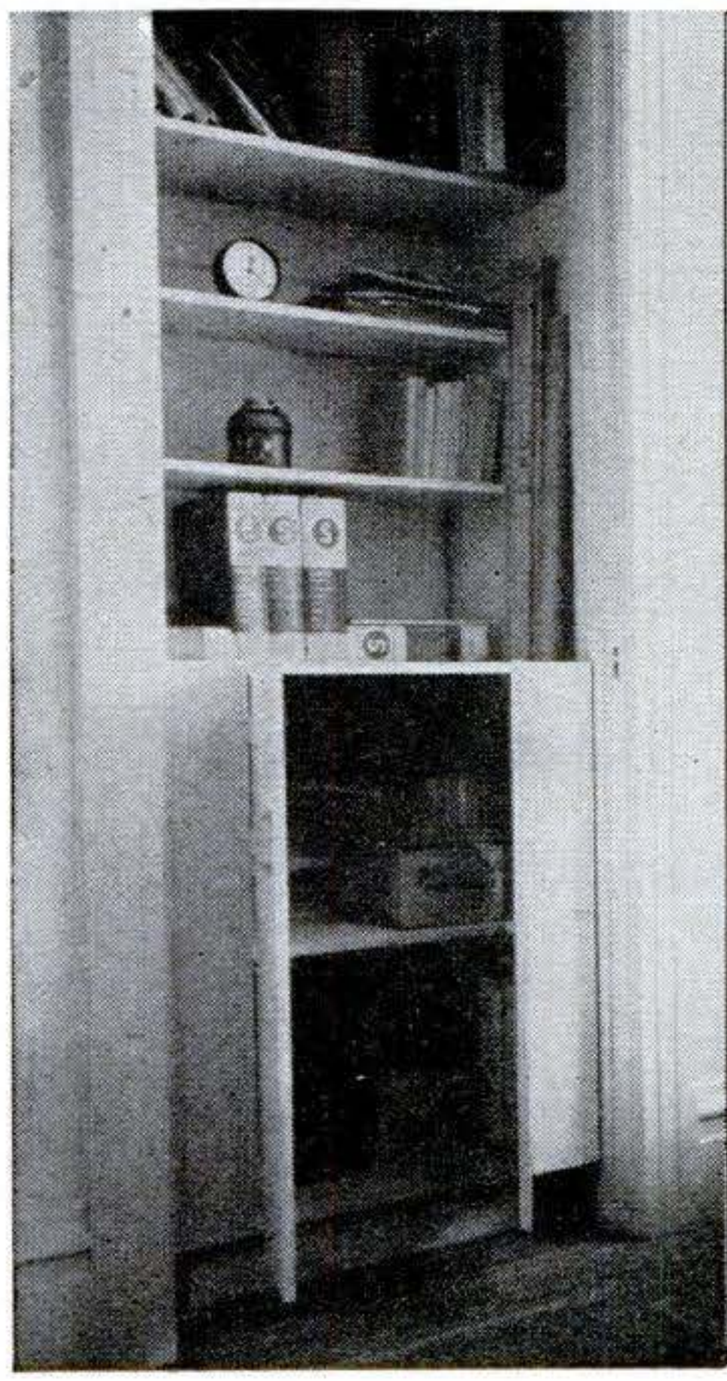
Copyrighted material

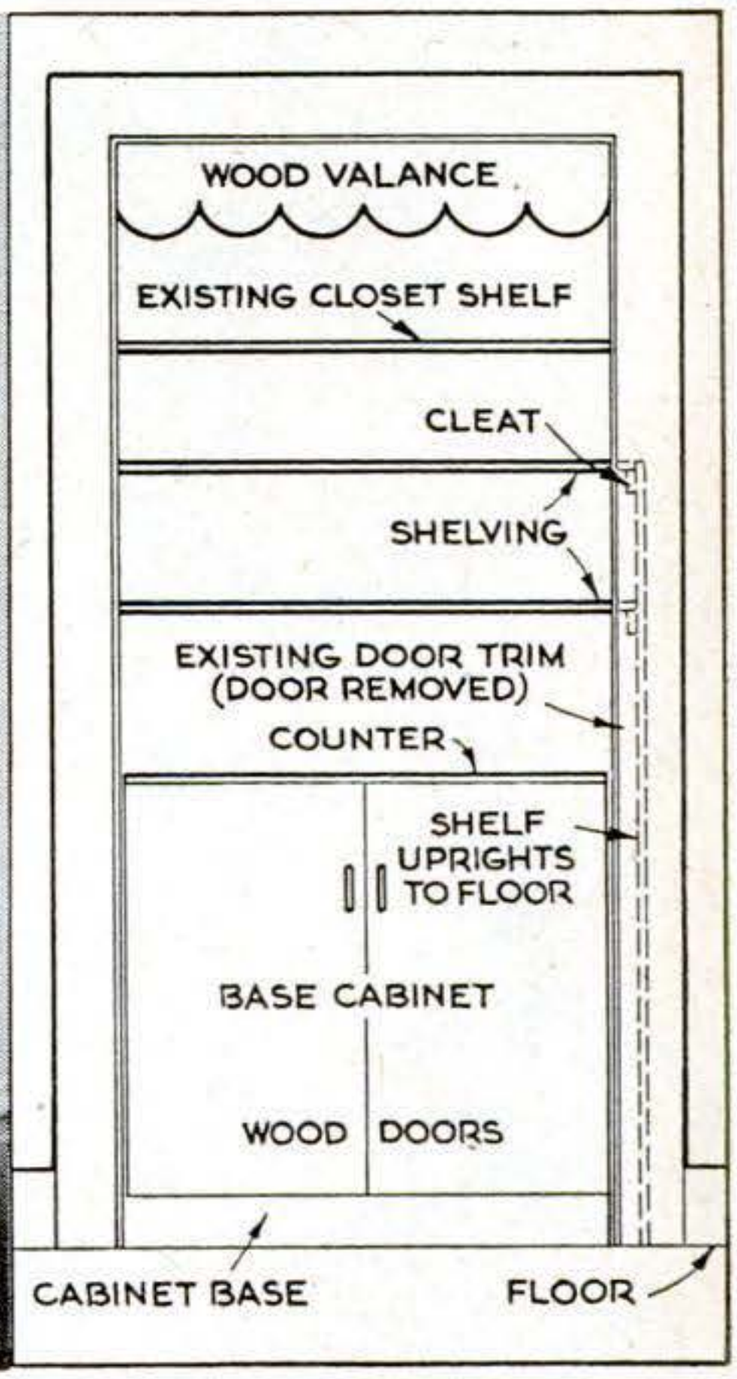
Shelves and Cabinet Transform Extra Closet

When a bedroom was made over into a den and its shallow closet no longer needed for ordinary purposes, a few shelves and panels served to convert it into a combination bookcase and storage cabinet. The installation was made so as to allow painless reconversion should that be necessary.

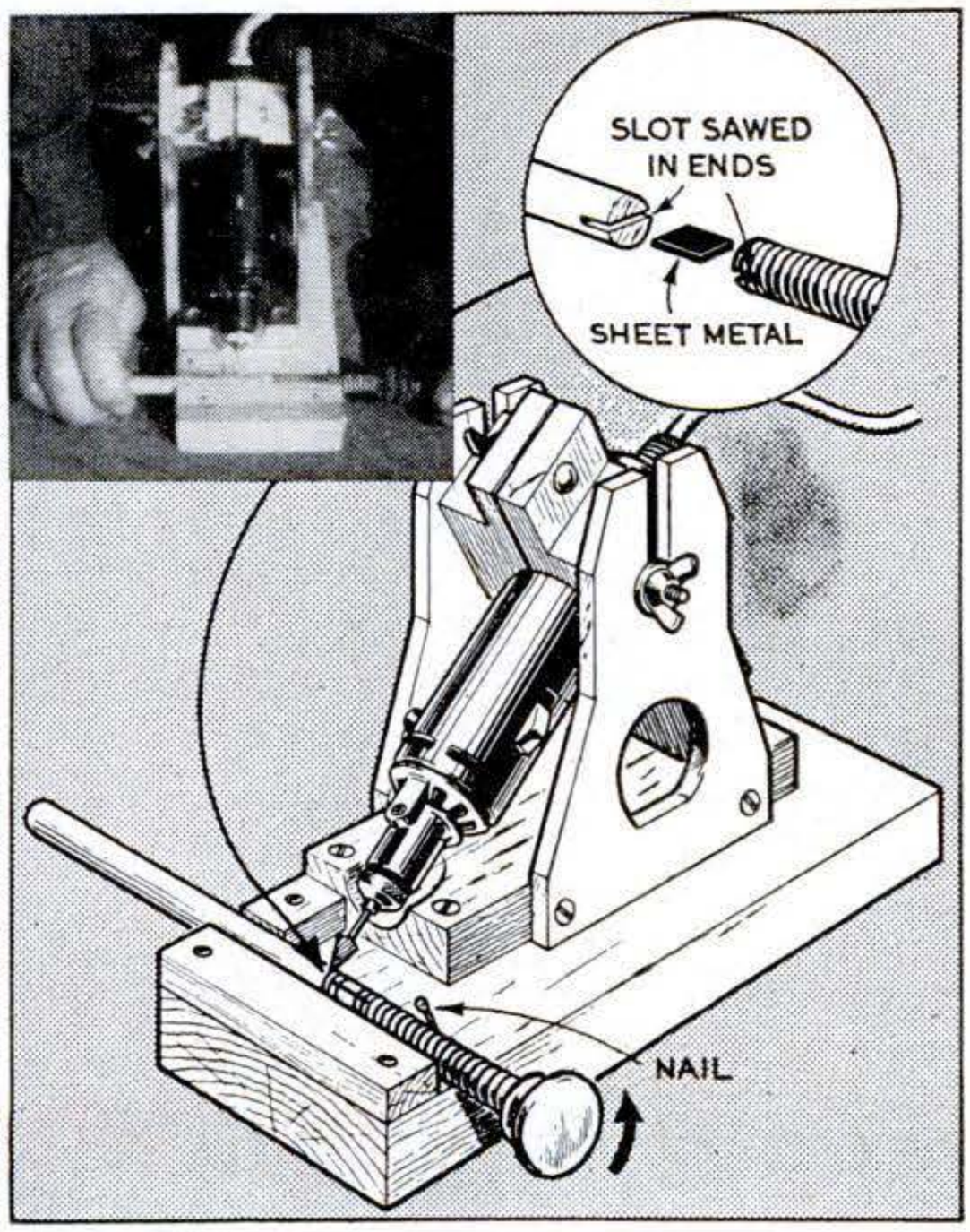
First step was the removal of the door and hinges. Cleats were nailed to uprights inserted at both sides to support the 1″ by 12″ pine shelves. The cabinet—which does not have to have a back—is measured to fit inside the door opening. When the cabinet doors are closed, the front of the unit does not extend over the jamb.

A valance is jigsawed from wood and tacked into place by means of small corner strips. Pieces of cardboard are cut out to fill the hinge mortises and are fastened in place with rubber cement. Painting over the cardboard will make it virtually impossible to detect the places where the hinges had been, but the cardboard can be peeled off without difficulty. With care, the same stunt can be used to disguise the strike mortise on the lock side. Remove the strike and cut cardboard to fit in its place.—Paul F. Illes.





Hand Grinder Jig Duplicates Threads on Dowels

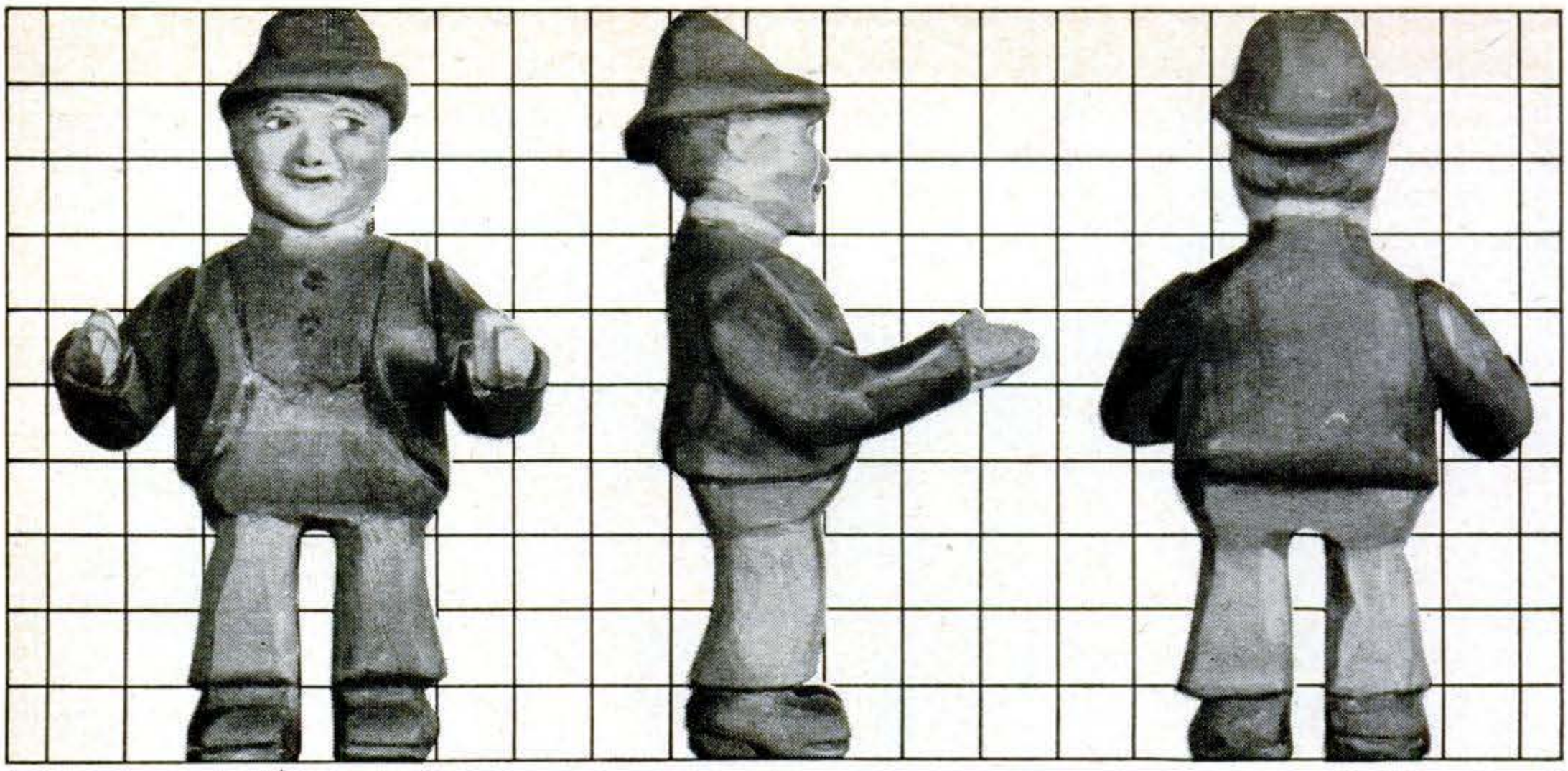


A high-speed hand grinder may be used to transfer a thread to a dowel so that it can replace a badly worn clamp screw, drawer pull, or the like. Guide blocks and a tool holder are fastened to a wooden base and the dowel and threaded piece are both slotted as shown. Join them at the slotted ends by a small square of metal, and start the thread just back of the slotted end. Drive a small nail into the base so that the thread can be turned against it. Place the tool point a little above the center of the work, and slowly revolve the dowel in the direction indicated. After threading, saw off the slotted portion.—Ralph S. Wilkes.

Pad Makes Small Parts Visible

A piece of dark felt glued to a block becomes an oasis on a cluttered bench. Small parts placed on it won't get lost, and tiny objects may be examined easily against the dark background.—Herbert Pfister.

Copyrighted material



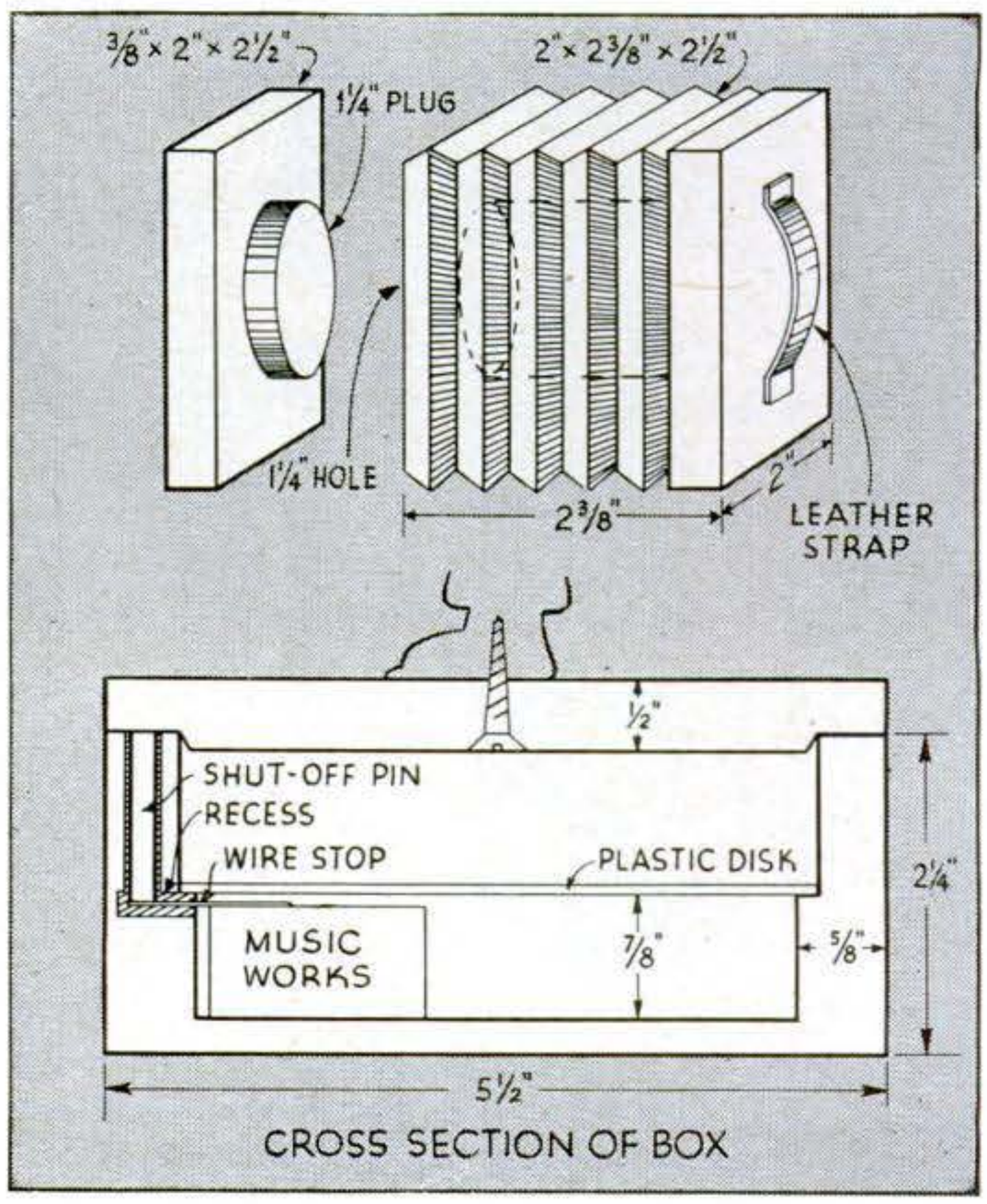
Accordion Conceals Small Jewelry

To look at him you'd think that this little man and his stomach-piano had no other job than that of adorning the top of a jewel box. This is just what you are supposed to think, because actually his accordion is a secret safe for rings and other small jewelry. As an extra frill, space is provided in the bottom of the box for a Swiss musical movement that sounds off when you lift the lid.

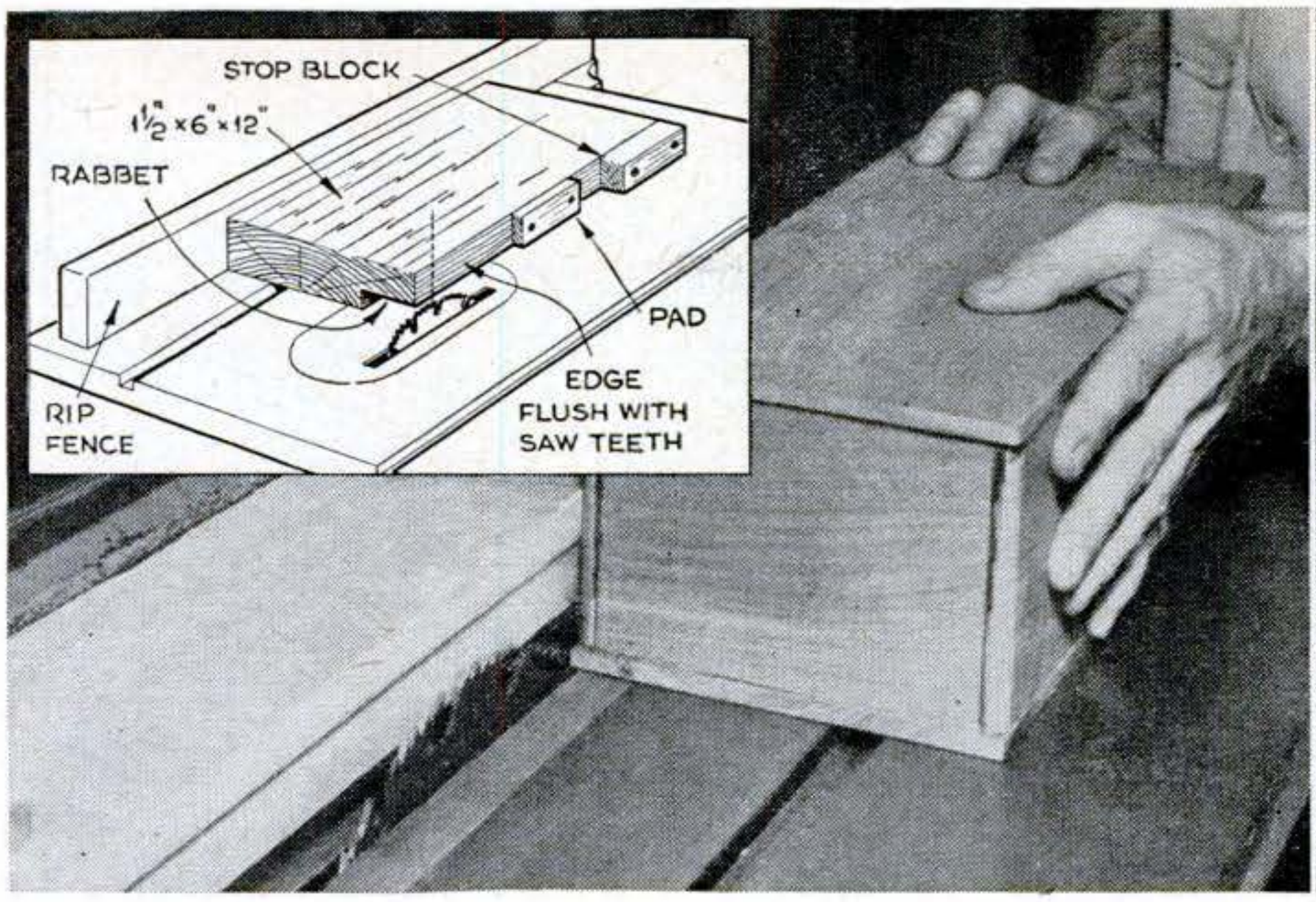
Saw and carve the little fellow from 2″ stock, and make the arms separately out of ¾″ wood. Soft pine is a good choice because it carves easily and takes a nice paint finish. Outlines are given above on ½″ squares but this can be varied if you make similar adjustment in the size of the accordion and box.

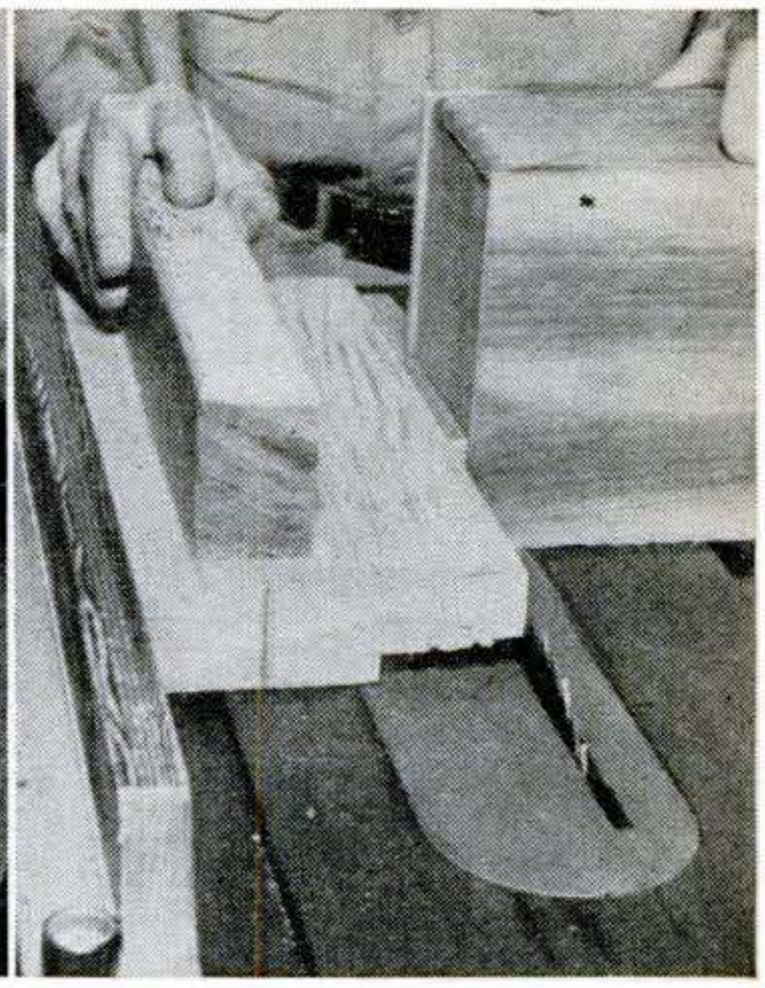
For the accordion, mount a piece of soft wood on the screw center of a lathe and turn out a cavity 1¼″ in diameter and 2″ deep; then mount another piece and turn a plug to fit snugly into this opening. Cut and carve away excess wood until you have brought the squeeze box down to the size and shape shown. Fasten leather hand straps to the ends with brass escutcheon pins.

The jewel box is turned of hardwood. Glue together three pieces of ¾″ stock of 5¾″ diameter. Turn out the inside as indicated, and drill a hole through one wall to take a ⅛″ dowel shut-off pin. Mount a standard music works in the lower part of the box, allowing the shut-off lever to extend within range of the pin. A circle of clear plastic will cover and protect the musical mechanism yet allow it to be seen. Turn the box lid from ½″ stock. The shallow ledge that fits into the box will keep the lid in place. One or two small screws driven from the under side of the lid hold the figure on top.—Elma Waltner.



Copyrighted material



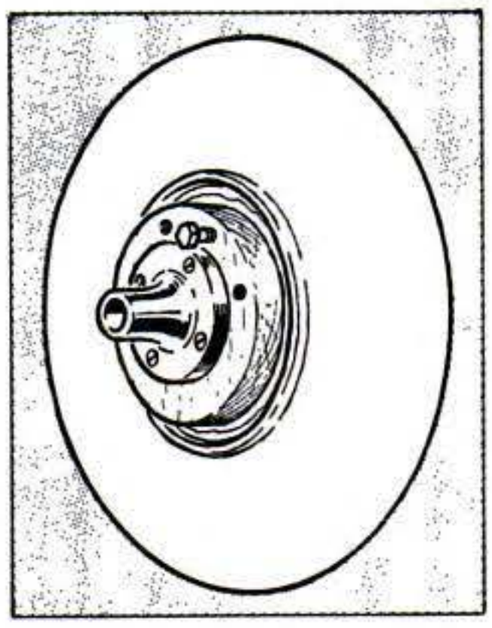


Special Jig Trims Off Projecting Edges on Boxes

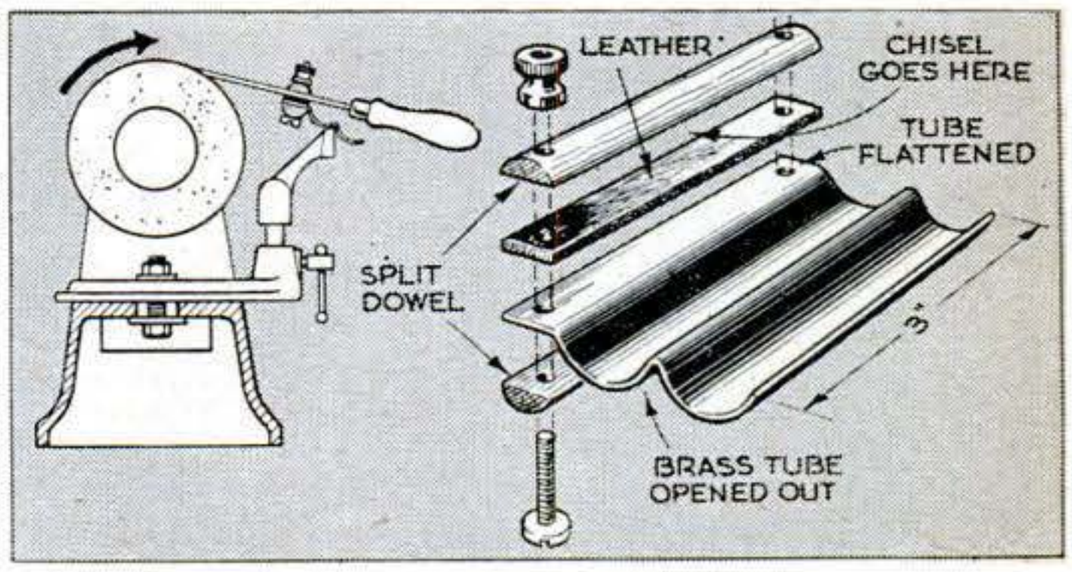
THE usual method of pattern sawing, as in the photo at left above, employs a stationary overhanging fence along which the work is moved to cut off projecting waste. When the end of a box must be trimmed, however, the method is useless, since the vertical projections or sides of the box bear against the fence and thus prevent you from cutting the horizontal ones.

A special sliding jig, shown in the inset drawing and in the photo at the right, solves the problem neatly. It is fitted with a pad of wood of suitable thickness to locate the vertical face of the work just at the line of the saw. A stop block is also nailed on to locate and hold the box in place against the jig. When both box and jig are moved as a unit along the fence, projecting edges are cut off flush as the box is turned on each of its four sides.—JOHN P. ARNOLD.

Screws Free Faceplate Work



AFTER turning a wooden plate or bowl that is glued to a disk on the faceplate with an intervening piece of paper, you may have trouble in splitting off the disk, especially if a bead was turned on the bottom. Attempting to pry it off is apt to damage the bead. To avoid this, drill three holes in the disk before gluing the turning stock on, of a size ½" bolts will thread themselves into. When you are ready to free the work, drop small metal washers in the holes and screw in bolts. Advance each a fraction of a turn until it is pried off.—D. H. MATHESON.



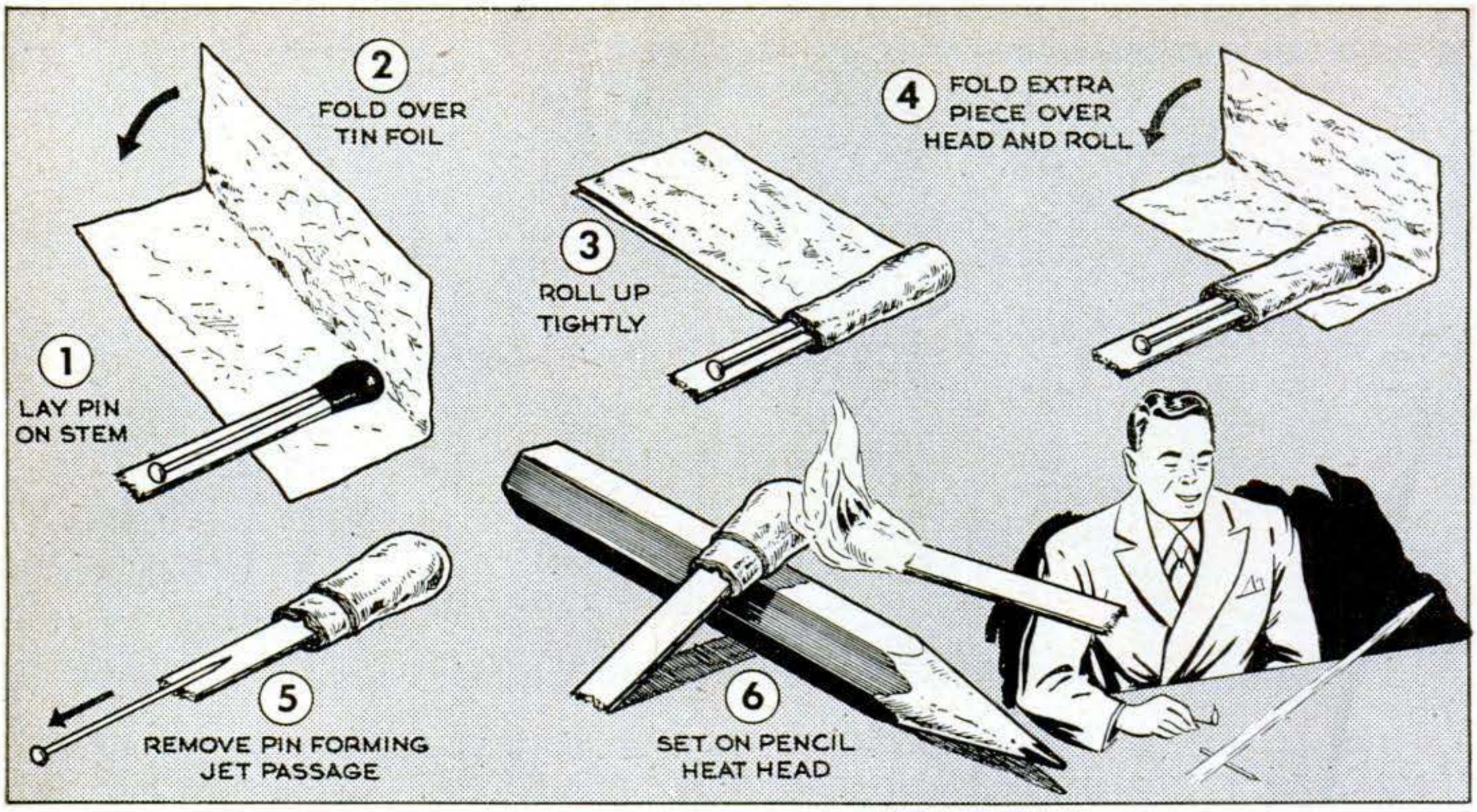
Tubing Guide Aids Sharpening

YOUR scrap box will provide materials for this gadget for sharpening plane irons and chisels. You can remove the tool frequently to dip in water and still return it to the same position against the wheel. A split dowel and an opened-out length of tubing make up the device; it is aligned in use by resting the groove thus formed upon the reversed tool rest of a wood lathe.—PARKER E. HART.

Common Gasket Cement Has Additional Shop Uses

GASKET cement, sold in auto-supply stores in dauber-fitted bottles, is a fine workshop cement. It will hold on wood or metal and is proof against alcohol, gasoline, and water. Use it for holding felt on the base of lamps, for attaching patterns to metal, and securing raveled insulation. It's hard to get off, so keep it off fingers.

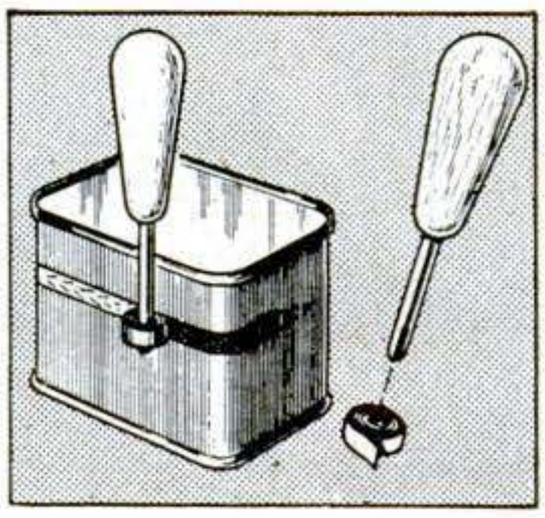
Copyrighted material



Match and Tin Foil Make a Miniature Rocket

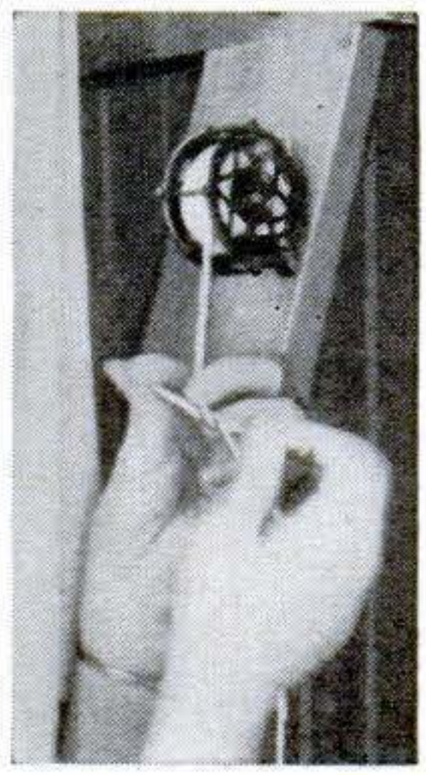
IT TAKES less than a minute to build and launch a tiny rocket made from a paper match by the method detailed in the numbered drawings above. When an external flame is brought close to the foil-wrapped match head, heat is conducted inside the chamber. Combustion energy set up here can escape only through the tiny jet passage left by withdrawing the pin. The engine reacts by rocketing off in the opposite direction. Caution: This rocket really travels, so don't try it in a confined space, and make sure that there is no one in the line of fire of the tiny projectile.—ALBERT MEDWIN.

Slotted Pick Opens Cans



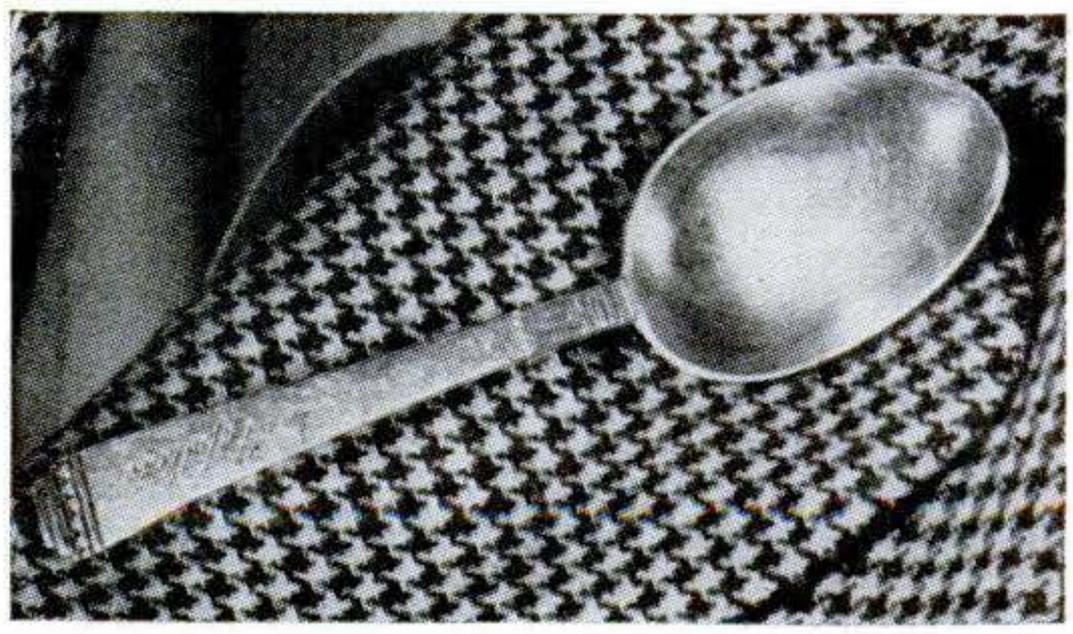
A KEY-TYPE can opener of the kind illustrated requires less effort to roll back metal sealing strips than does a small key because it gives a full hand grip. Heat an ice pick or small screwdriver red hot and let it cool slowly to remove temper. Cut off all but about 2″ of shaft, file the end round, and then slot it for a length of about ½″.—JOHN D. NOBLE.

Old Fishing Reel Saves String



EVER wonder what to do with those short pieces of string? Usually you can't find an untangled length when you want it. One answer is to roll the string onto an old fishing reel fastened inside a cupboard or closet door. When a piece of string is to be added, simply tie it onto the end and then wind it up.—ARTHUR HOLMES.

Baby's Spoon Forms Lapel Pin



WHEN baby graduates from his first diminutive spoon, you can celebrate the occasion by turning it into a lapel pin for his mother. Many baby spoons are sterling silver, beautifully chased or engraved. Soft-solder to the back of the handle a safety catch from a discarded brooch. A safety pin will do in a pinch. For a de luxe job, have the spoon gold plated at a jeweler's.

Copyrighted material

Scoop Shelves Brighten Corners

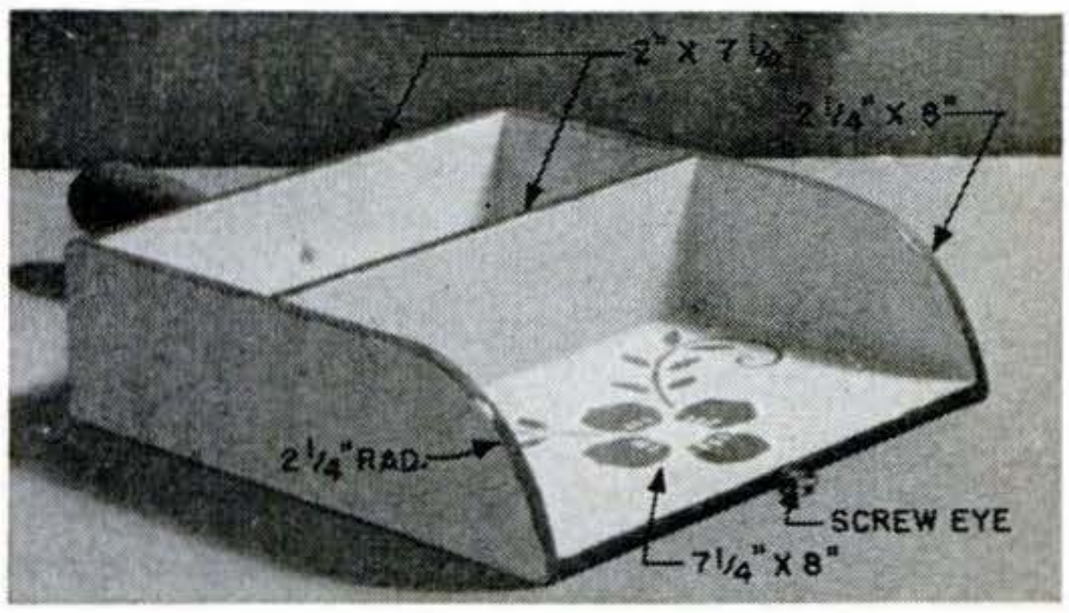
EQUALLY at home as kitchen spice cabinets or living-room shelves for small bric-a-brac, these hanging scoops or dustpans can be turned out with hand tools in less than an evening. You'll find they generally look best in pairs.

Cut a cardboard template for the sides and trace around it on ¼″ plywood. Make two 7¼″ by 8″ back panels, four 2″ by 7¼″ shelves, and four 2¼″ by 8″ sides. Each of these last pieces is rounded at one corner to a 2¼″ radius. Sand all surfaces smooth, and assemble the boards with brads, setting the heads a trifle.

Fill nail holes and any other surface flaws with plastic composition wood. Also rub it into all edges and joints, sanding again when it's dry. Seal the surface with two coats of shellac and then paint with a quick-drying enamel.

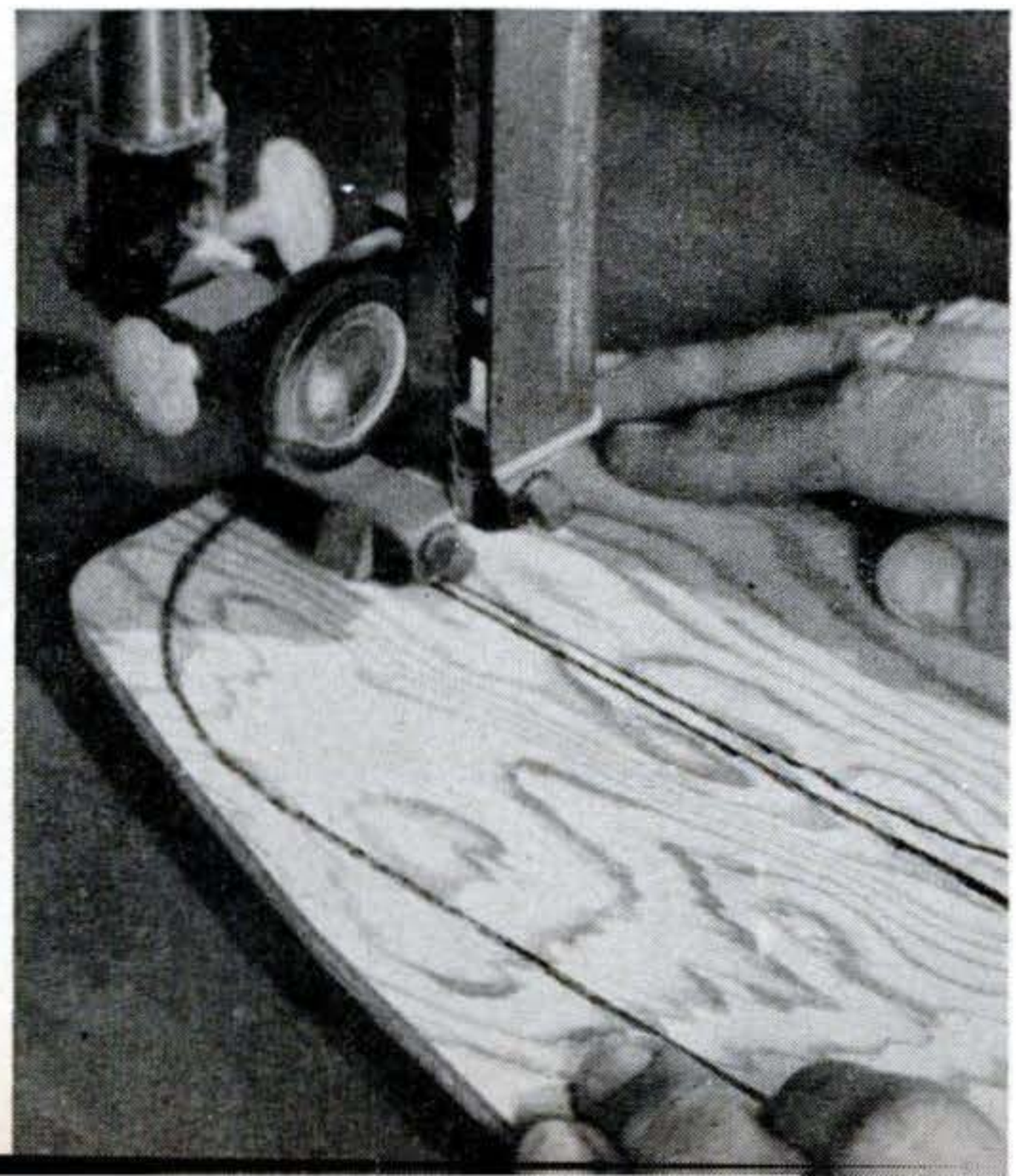
File handles with the ferrule sections cut off are attached with countersunk flathead screws. Insert small screw eyes for hanging and drive rubber-headed tacks into the lower corners to keep the shelves from tipping if unevenly loaded. The decorations may either be decals or designs drawn freehand on paper and then transferred with carbon paper. In the latter case, use tube oil colors mixed with turpentine and a little varnish.—BILL LUTHER.

Patterned after old-fashioned dustpans, these hanging sheves are ideal for small bric-a-brac.



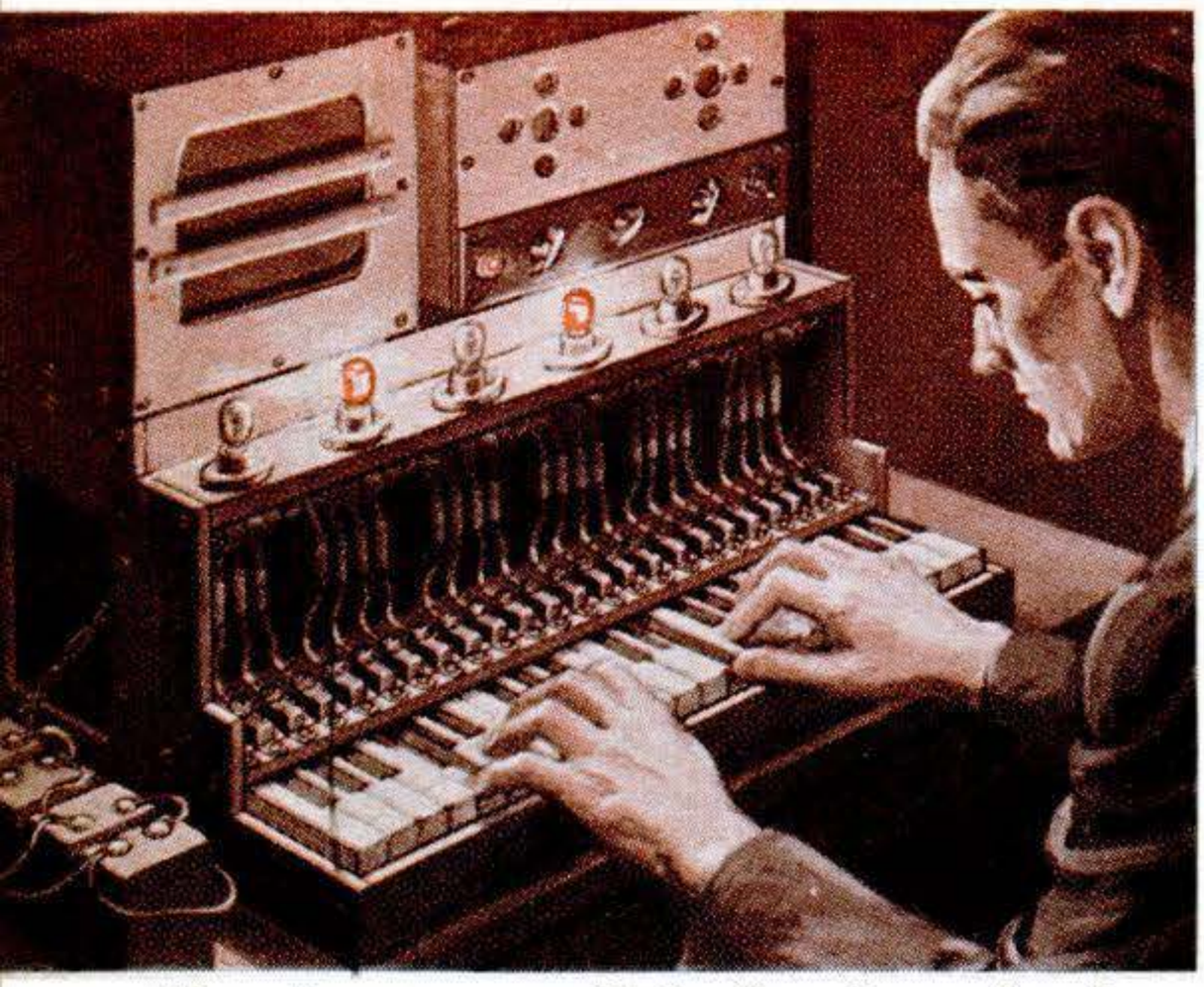
The curved sidepieces overlap both the shelves and the back. Simple butt joints are employed.

Though a bandsaw or jigsaw helps, the sides are easy enough to cut with an ordinary coping saw.

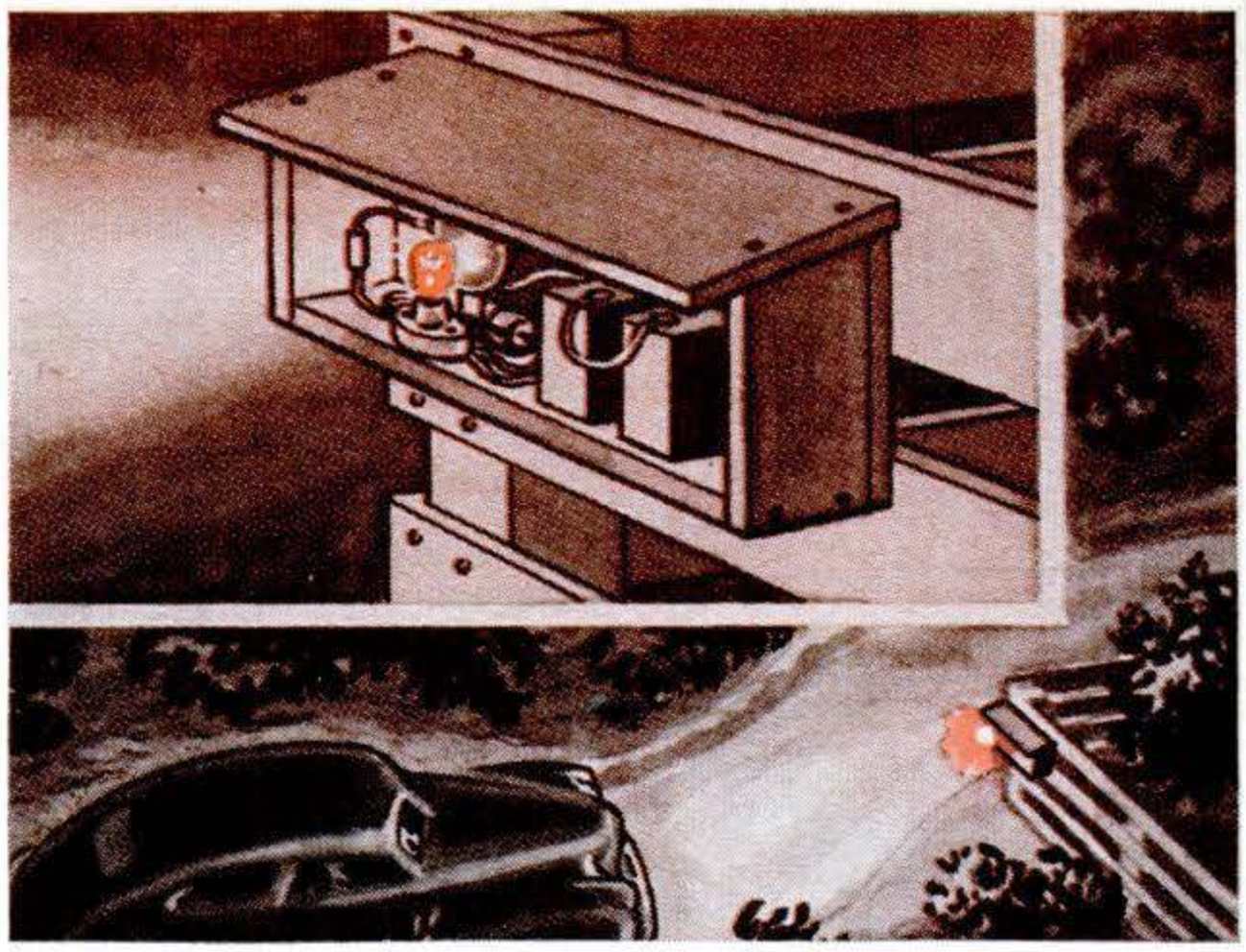


Sand all pieces smooth and draw guide lines for nailing; then assemble with ¾″ wire brads.

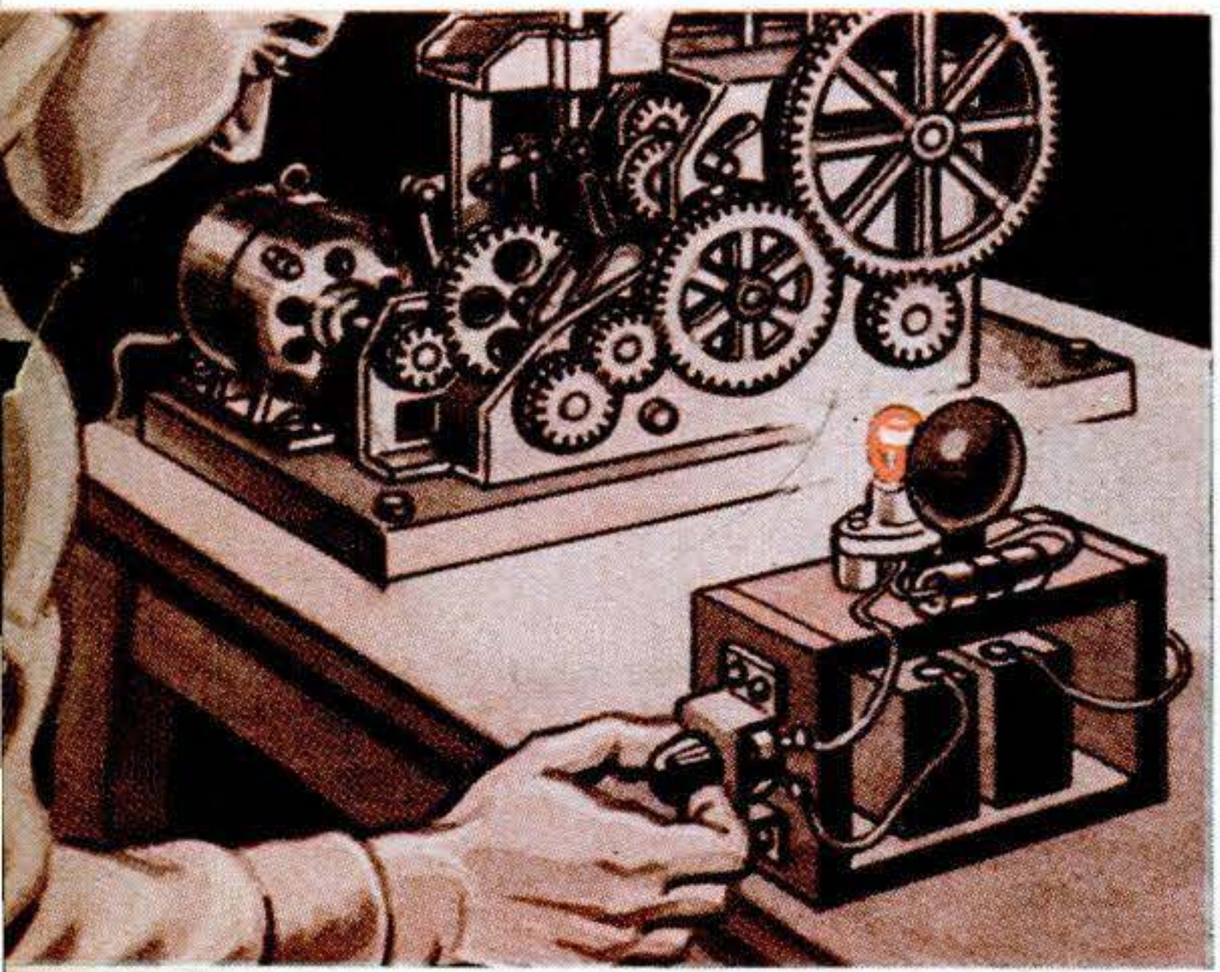
Copyrighted material



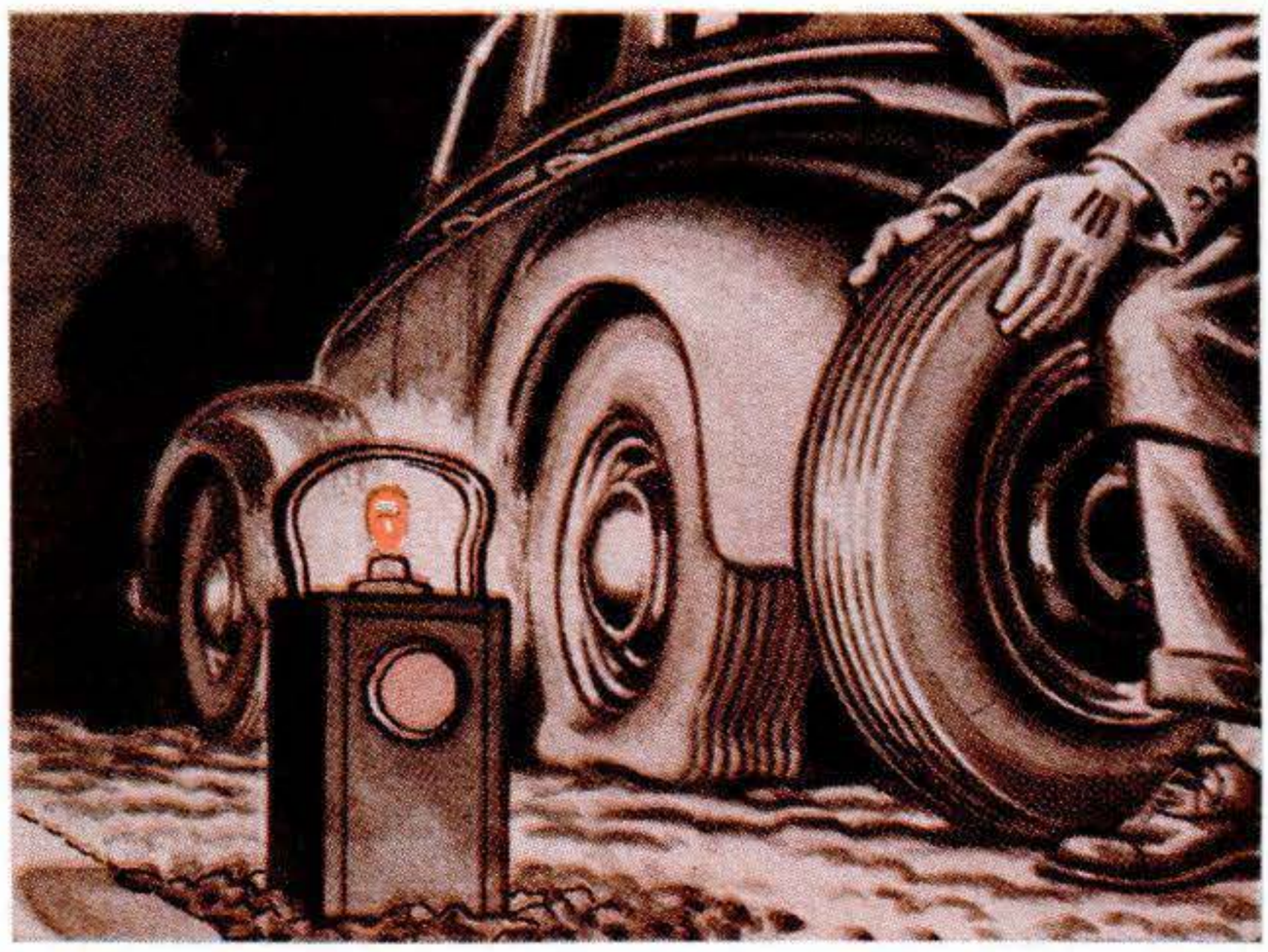
Electric organ could be based on glow-lamp oscillator circuits feeding an audio amplifier.



Night hazards can be marked with blinkers that will operate months on the same battery.



Motion is stopped by a synchronized glow-lamp stroboscope. The room lights must be out.



Portable blinkers warn of danger. Similar units guided columns of tanks during wartime action.

Magic with Neon Glow Lamps

By Walter E. Burton

ALADDIN had his lamp, but you can buy a modern substitute at any radio-supply shop. Glow lamps are practically little genii under glass. Once you know their secrets, they stand ready to do all sorts of chores—from playing Aloha electrically to "stopping" a machine in full motion so you can see what makes the wheels go 'round.

A glow lamp consists of two electrodes—wires or plates—surrounded by inert neon gas. When the electrodes are connected to a sufficiently high voltage, light is produced at the negative one. On AC, of course, the electrodes take turns at being the negative one, changing polarity so rapidly that the eye sees both glowing steadily.

Glow lamps consume very little current, the smallest drawing 1/25 watt and the largest about 3. The tiniest have the longest life—about 25,000 hours. Bigger ones are good for 3,000 hours. Even then a glow lamp doesn't burn out; it merely gets dim-

Copyrighted material

mer gradually. This makes the lamps ideal as indicator or pilot lights, for they can't quit suddenly and so fail to give warning. They produce no appreciable heat and are not sensitive to shock or vibration.

Glow Lamps Trigger Current

The curious thing about glow lamps is that they don't—and then again they do—conduct electricity. Connect a glow lamp to half a dozen dry cells, and nothing happens. Increase the voltage to a certain critical point, and in a millisecond several things happen. The inert gas is ionized, becoming a conductor. Current passes, light is generated, and if you haven't put a resistance in the circuit, the lamp will quickly "run away," or pass so much current as to destroy itself. This instantaneous trigger effect is constant, tireless, and useful in several ways, as will be shown farther on.

To limit current to a safe value, a resistance must be connected in series with each lamp as in Fig. 1. Lamps with screw bases have a built-in resistance and require no external one on ordinary 115-volt house current, but extra resistance should be added if they are connected to higher potentials. When several lamps are connected to one power line, each lamp must have its own resistor as shown in Fig. 2. They cannot be operated in series.

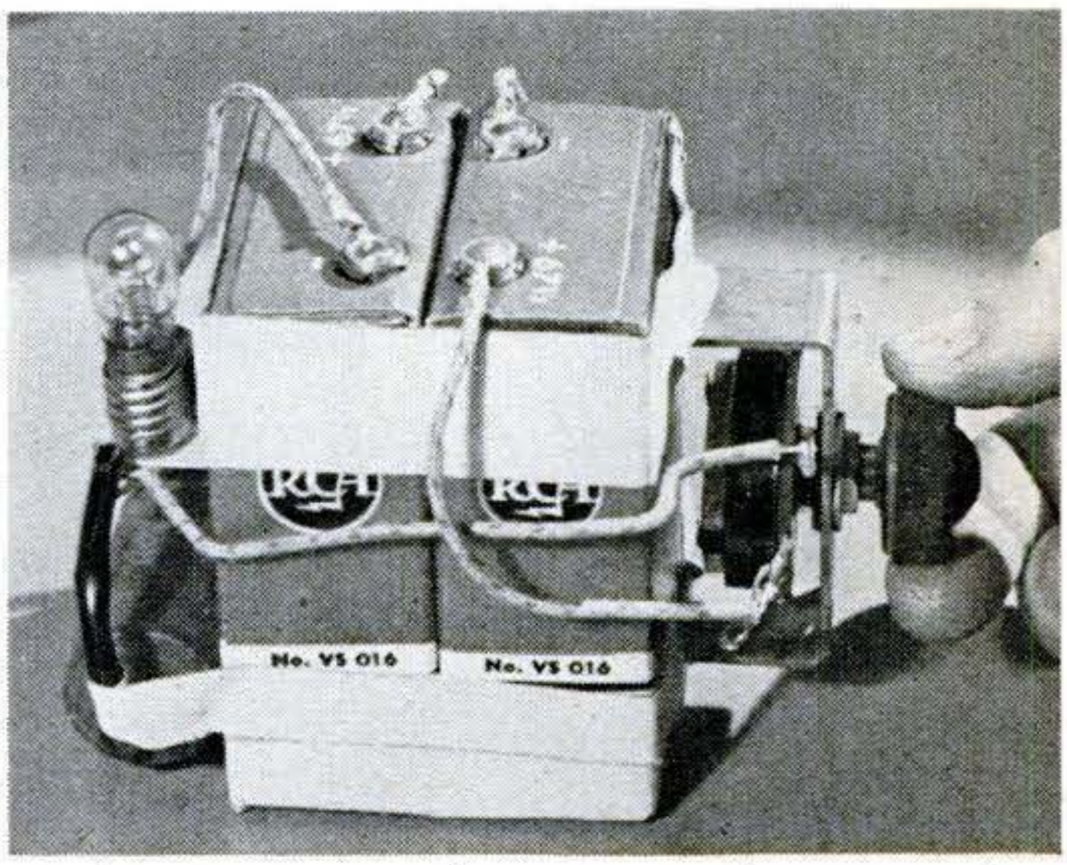
Lamps as Electrical Tools

Everybody, from the radio service man to the householder who just blew a fuse, will find use for a gadget that shows whether the juice is there. Just connect a 1/25-watt lamp with a resistor, some flexible insulated wire, and a pair of phone tips as in Fig. 1. It's a good idea to house the lamp in a glass or plastic tube. The gadget will also indicate DC polarity once the leads are identified. Touch them to a radio B battery of 90 volts or more, mark the lead touching the negative terminal, and mark the lamp base or housing to indicate the lighted electrode.

If you add a common radio potentiometer to the tester circuit as in Fig. 4, and calibrate the potentiometer dial, you'll have a handy tool-kit voltmeter. It works on the principle that the ionizing or starting (breakdown) voltage of a lamp is always the same —about 90 volts DC and 65 volts AC for 1/25-watt lamps such as the NE-2 or NE-51 —and that on falling voltage the lamp will suddenly cease glowing at an equally definite point. On DC, this maintaining voltage is about 15 volts less than the starting voltage, but on AC it's about the same.

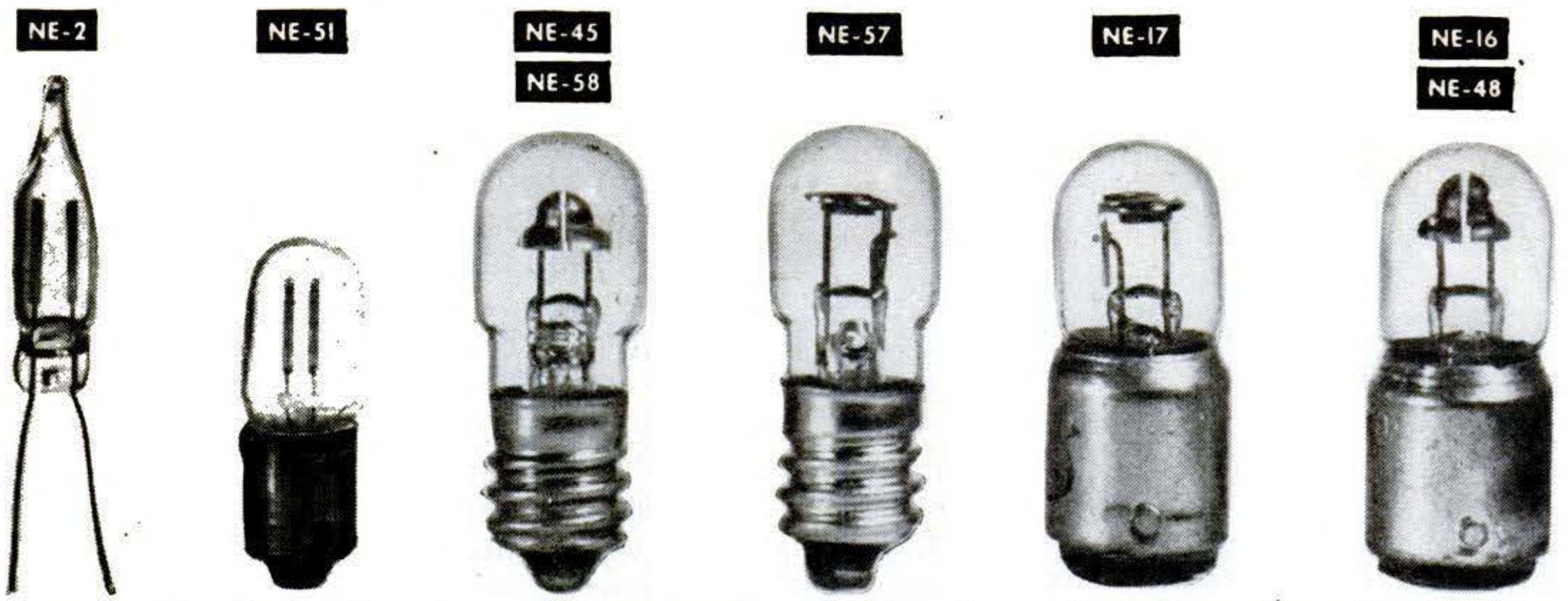
If you connect the circuit in Fig. 4 to 120 volts DC and turn the potentiometer up, at some point the voltage across the lamp will top 90 and the lamp will suddenly glow. If you now move the potentiometer back slowly, you'll find a point at which the lamp goes out. Mark this point 120 volts DC on the dial. Repeat the calibration on other known voltages of AC and DC. On an unknown voltage, simply turn the knob until the lamp lights, and then back to where it goes out, and read the circuit voltage off your dial. [Turn the page.]

Batteries charge the condenser to ionizing voltage, and it then discharges through the lamp.



High resistance such as 10 megohms gives slow flashing. The unit makes a compact package.

Copyrighted material



Lamps with wire leads or bayonet bases need external resistors. Screw bases have them inside.

A similar circuit can be used as a sound monitor for use with a microphone and a home recorder or other instrument. With the potentiometer left at the critical point as determined by test, the lamp will flash whenever sound output is too great.

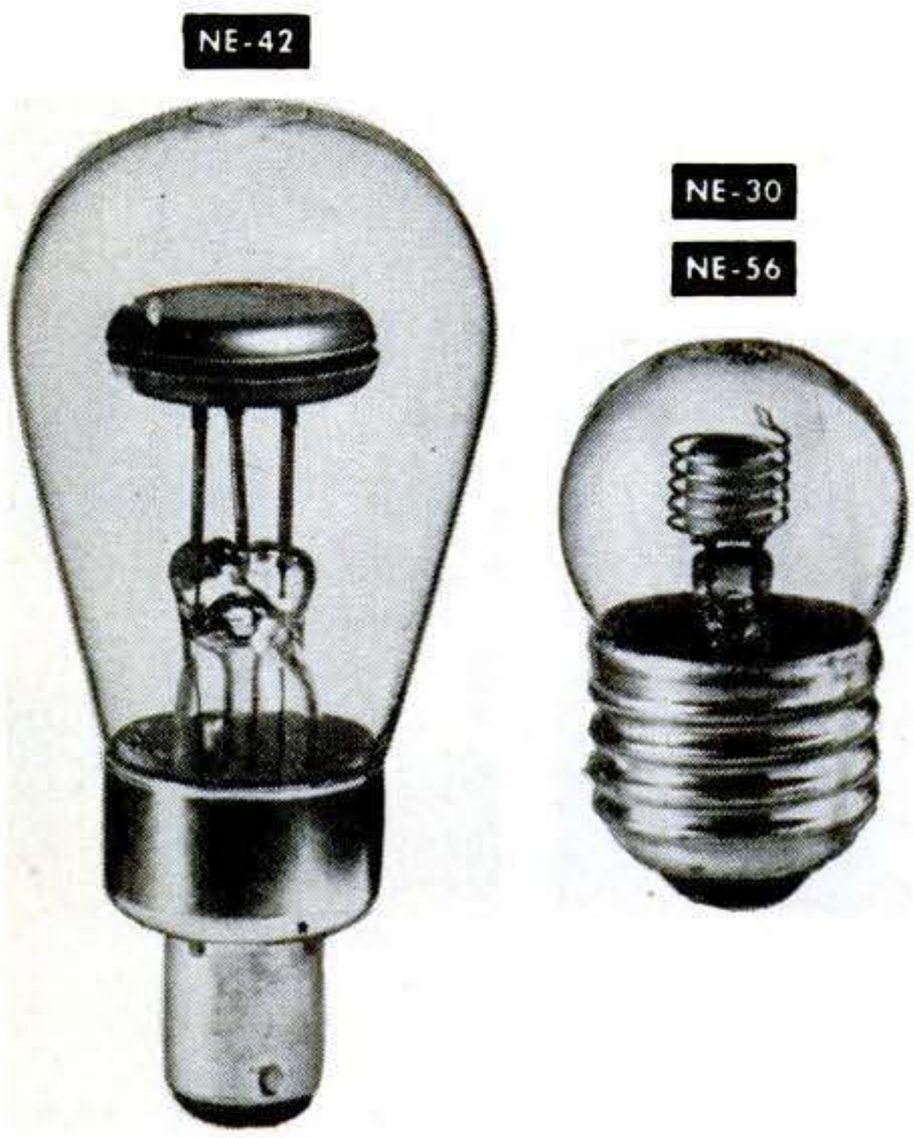
You can also, just for fun, hook the circuit in Fig. 4 to the plate side of the output transformer in a radio. Converting sound to light, it'll show you visually what's coming out of the loudspeaker.

Lamps That Wink at You

If you walk into the Nela Park office of H. M. Ferree, a General Electric engineer, you'll soon become aware of a contraption on one of the filing cabinets, for it winks at you—a reddish neon wink—every five seconds. It consists of a pair of 67½-volt B batteries, a radio condenser, a potentiometer, and a glow lamp. This particular setup has been winking for six months and is expected to keep it up on the same batteries for 18 more. Similar blinkers kept tank columns together in night movements during the war.

The blinker circuit is shown in Fig. 3. For visibility, a ¼-watt glow lamp with circular electrodes, such as the tiny NE-17 or NE-57, is recommended (use an outside resistor with the NE-17). Connect the disk to the negative side; then you can focus the light with a lens or mirror.

Potentiometer resistance in Fig. 3 should be about 10 megohms for one flash per second. Reducing this increases flash frequency, so by turning the potentiometer you can



Twin disks glow in the 3-watt lamp at left. The 1-watt lamp at right fits standard light sockets.

Circuit tester is a 1/25-watt lamp housed in a glass or plastic tube, a resistor, and two leads.

Copyrighted material

vary the interval. What happens is that the battery charges the condenser quickly or slowly as the resistance permits. The instant the condenser charge reaches the starting voltage of the lamp, the latter "fires," discharging the condenser, which then starts to recharge.

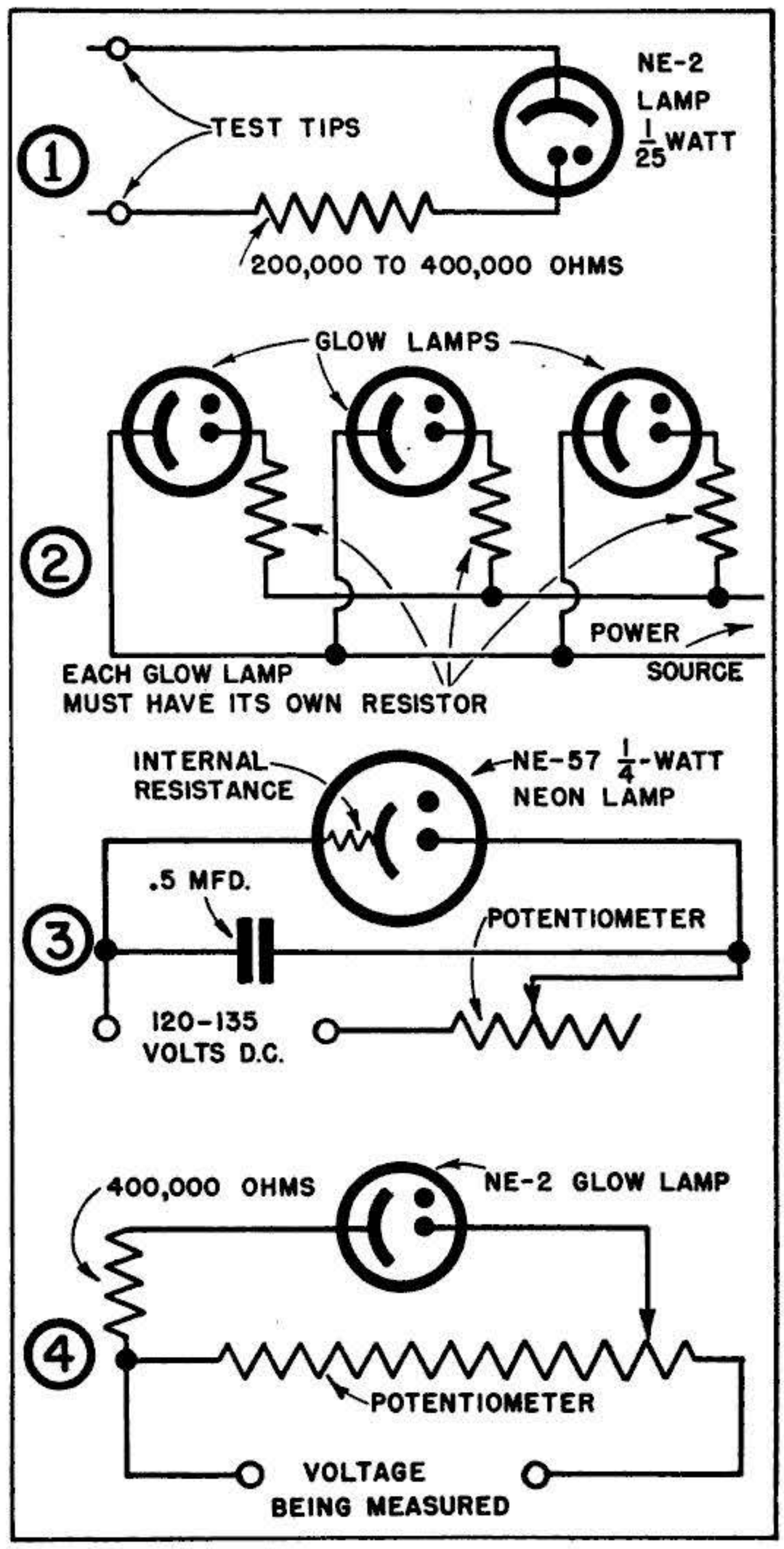
One use for such a blinker setup is as a darkroom timer. Count flashes for timing enlargements or other short-duration processes. Similarly, it might serve as a visible metronome for music students.

Another Nela Park engineer had a roadside mailbox vulnerable to night-time motorists. After rebuilding it once or twice, he installed a neon blinker. The mailbox hasn't been hit since.

Within a limited range such a light might be useful as a dock marker to enable boatmen to find their way back to shore. You could use one to identify your house by night, or by prearrangement as a signal that you are or aren't at home. If you have to leave your car in a hazardous location at night, a blinker may save you smashed fenders or worse. The gadgets might also be used to mark hazardous locations such as cliffs and culverts, and to guide others following in the dark.

Music from a Lamp

Vary condenser capacity and the series resistance, and you "tune" blinker frequency right into the audio range. Such a circuit appears on page 196. A heavy pencil line on the baseboard forms the variable resist-



NEON GLOW LAMPS

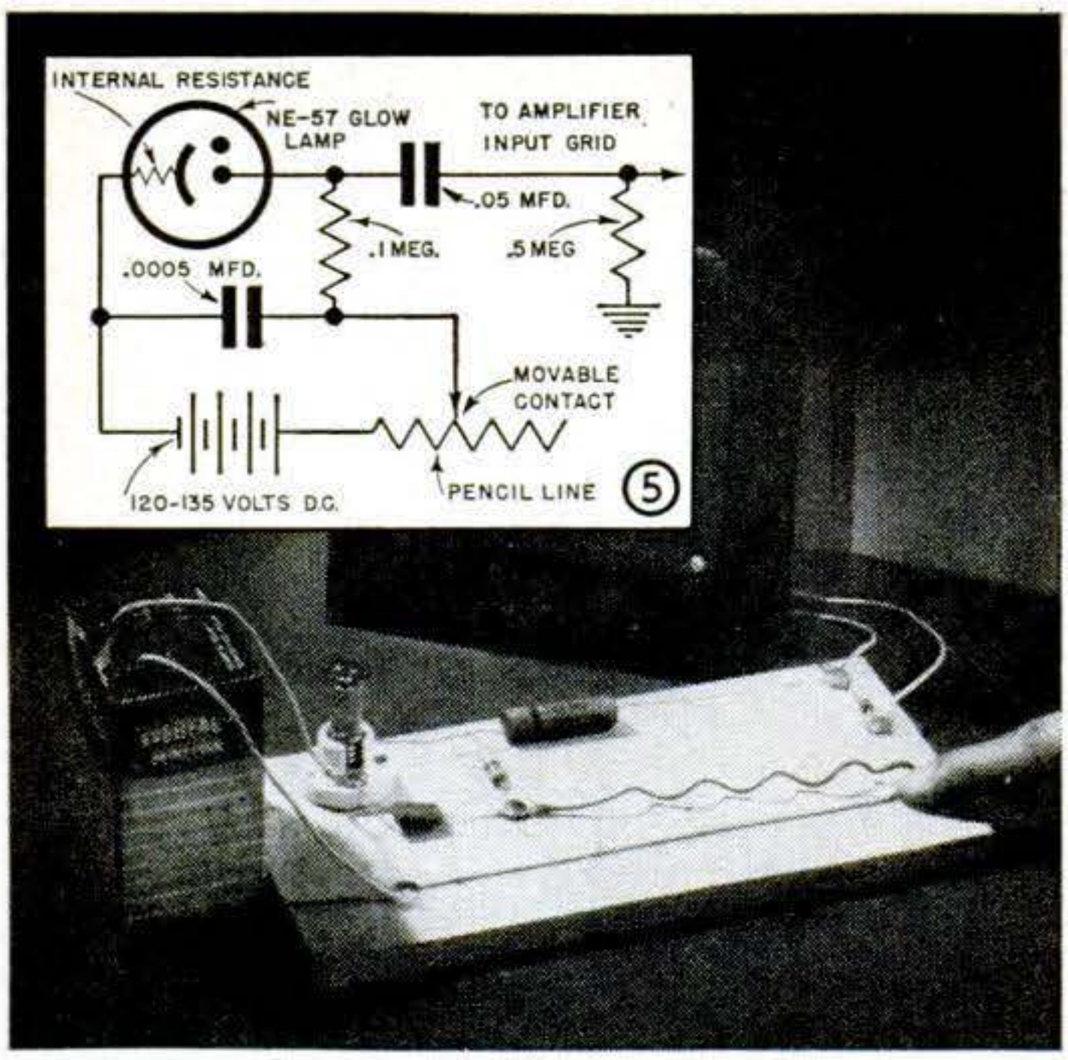
[ELECTRICITY]

Lamp No.	NE-2*	NE-45**	NE-48***	NE-30	NE-32	NE-34	NE-36	NE-40	NE-42
Watts, Nominal	1/25	1/4	1/4	1	1	2	2	3	3
Base	Wires	Candelabra screw	D.C. bay cand.	Medium screw	D.C. bay cand.	Medium screw	Sk. d.c. bay. cand.	Medium screw	Sk. d.c. bay. cand.
Starting voltage, approx.									
AC	65	65	65	60	60	60	60	60	60
DC	90	90	90	85	85	85	85	85	85
Series resistance, ohms, for									
105 to 125 v.	200.000	30.000†	30.000	4.800†	4.800	3.500†	3.500	2.200†	2.200
250 to 300 v.	750.000	82.000	110.000	13.000	18.000	9.100	11.000	6.200	8.200
300 to 375 v.	1.000.000	120.000	150.000	18.000	24.000	13.000	16.000	8.200	11.000
375 to 450 v.	1.200.000	150.000	180.000	24.000	30.000	16.000	20.000	11.000	13.000
450 to 600 v.	1.600.000	200.000	240.000	33.000	39.000	22.000	27.000	16.000	18.000

*NE-51 same as NE-2 but has single-contact bayonet miniature base.
**NE-57 same as NE-45 except starting voltages are 55 AC. 70 DC. and electrodes are different.
***NE-17 same as NE-48 except starting voltages are 55 AC. 70 DC. and electrodes are different.
Base abbreviations: D.C. bay. cand: Double-contact bayonet candelabra. Sk. d.c. bay. cand: Skirted double-contact bayonet candelabra.
† Internal resistance in base.

POPULAR SCIENCE MONTHLY SHOP DATA

Copyrighted material



A blinker tuned to the audio range creates music notes, "played" by varying the resistance.

ance, with which a thumbtack makes contact. Slide the flexible lead along the pencil line with the fingers. The tone is something like that of a flute. If the range isn't great enough, experiment with different values of condensers and resistors. You may prefer a series of fixed resistors and switches instead of a sliding contact. Couple the circuit to a standard amplifier through a small condenser as shown. A .5-megohm resistor from input to amplifier ground creates the necessary voltage drop on the grid of the input tube in the amplifier.

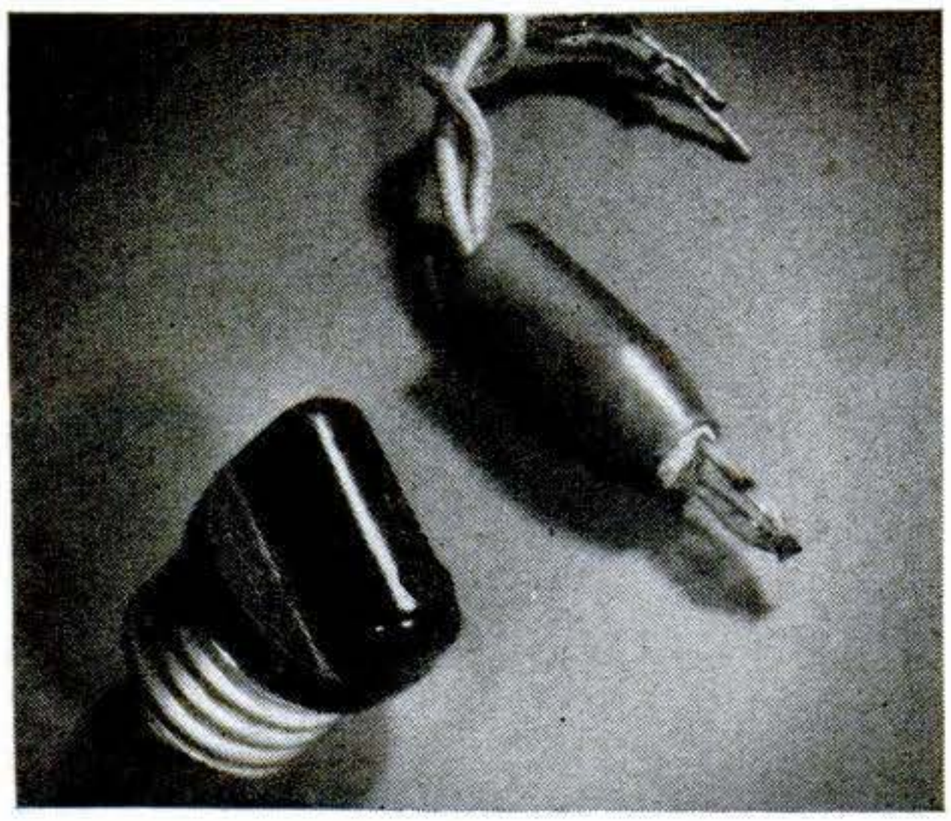
A lamp connected across the terminals of an open switch will glow if the rest of the circuit is complete and go out when the switch is closed, serving both to show whether it's open or not, and to locate it in the dark. A glow lamp shunting a fuse won't glow unless the fuse blows; then it signals the dead one instantly.

Twelve tiny glow lamps spaced around a circle make a distinctive illuminated clock dial, yet consume all together about ½ watt. If the clock face is made of transparent plastic, the glow will be diffused enough to silhouette the hands and show them plainly.

Since glow lamps have no thermal lag, but wink out the instant current is cut off, they have useful stroboscopic characteristics. For instance, you can check the speed of a camera shutter by photographing a lamp burning on 60-cycle AC. Use fast panchromatic film, and *move* the camera or the lamp during exposure. Thus a series of images is obtained. Since there are 120 flashes per second, you have only to count the images to learn how long the shutter was open. For instance, 12 flashes show the shutter speed was 1/10 second.

Stroboscopic disks commonly used for checking the speed of motion-picture projectors and phonograph turntables are used with neon glow lamps. Naturally no other light must shine on the moving disk. When the machine runs at the correct speed, the disk appears to stand still, while any deviation makes it seem to run backward or forward at a rate proportional to the difference.

Machinery, springs, anything in repetitive motion, can be studied stroboscopically by neon lamps. Use a blinker circuit with a frequency comparable to that of the action. Turn out all other light, and synchronize the lamp with the device by using a potentiometer control. You can stop action completely or, by going just a little "out of phase," get the effect of a slow-motion camera. END



Pocket Tester from Old Fuse

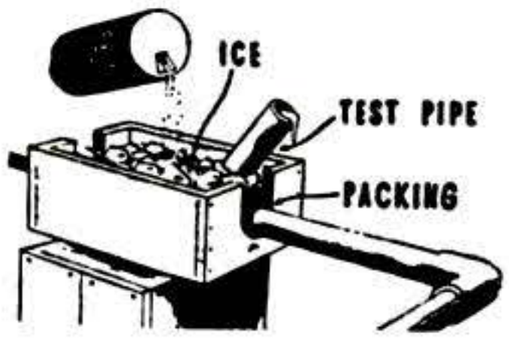
A HANDY tester can be made from a burned-out multiple fuse of the kind that glows as each fuse link is blown. Pry off the cap, being careful not to damage the fine leads going to the lamp and the tiny resistor. Bore a hole in a short plastic rod to hold the lamp. Solder on two insulated test leads, tape all joints, and pack the bulb and wires in securely with plastic composition wood. The gadget will tell if a circuit is alive, identify the "hot" side, and track down shorts, opens, and grounds.

Copyrighted material

What's Your Ingenuity IQuotient?

I Was in a Hole when a tire blew out on a back road. Having a spare tube but no blowout patch, I laid an old magazine inside the casing. It took me 20 miles to a gas station with pages to spare.—C. DAWES.

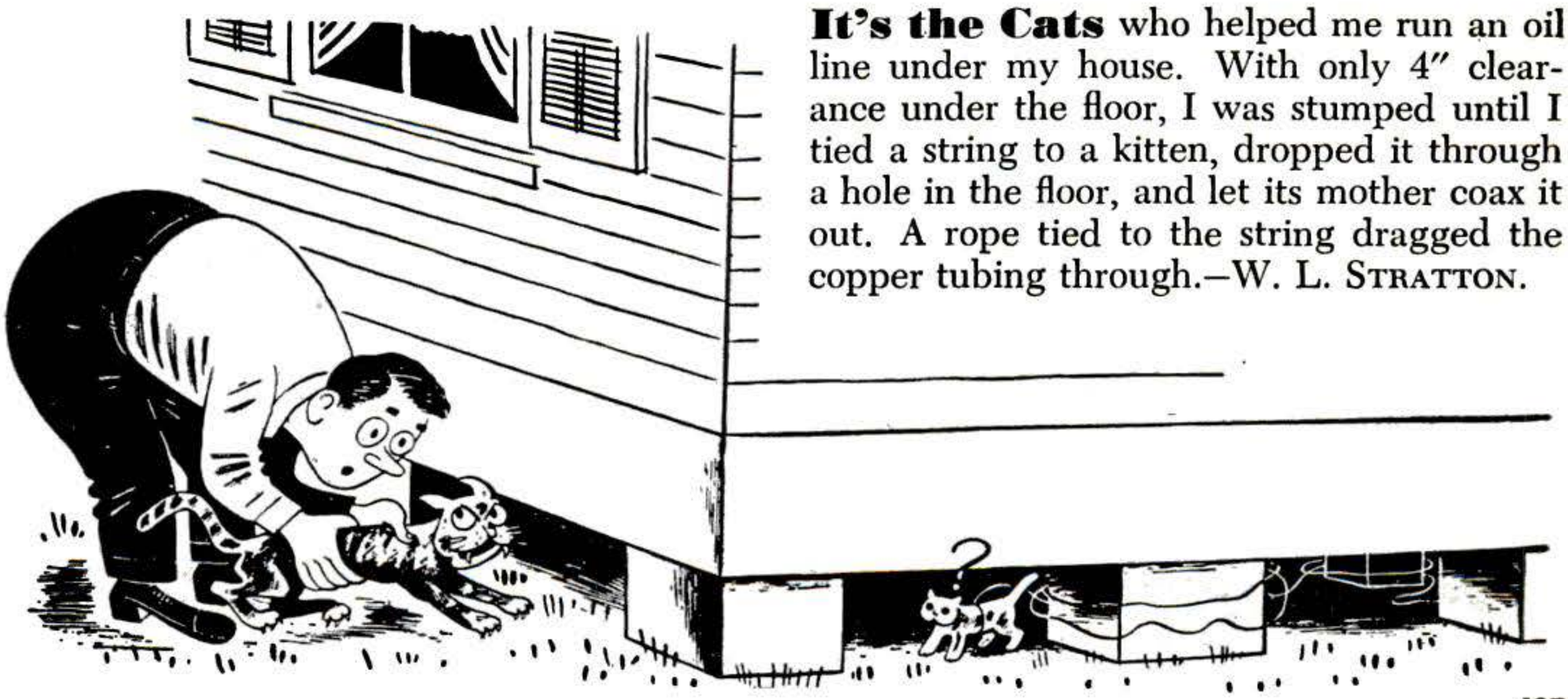
Leaky Faucets, no cellar shut-off, and the yard valve buried by a shift in the fill! Rather than dig it out, we built a box around the cellar main line, stuck a capped nipple full of water next to the pipe, and poured in ice and rock salt. When water in the nipple was frozen, so was a plug in the line. We fixed the faucets, thawed the line with hot water, and nary a drip.—ELTON STERRETT.



Gutters Are Silent, so when I phoned my sister to ask what size leader to buy, they wouldn't talk. The ladder was too heavy for her to manage and she couldn't reach high enough to measure the spout. Finally I asked her to lay a bar of soap on a mop and press it against the spout. After measuring the impression on the soap, she gave me the size.—ARTHUR TRAUFFER.

Have you pulled off a smart one lately? We will pay for acceptable contributions showing ingenious solutions of problems in the home, shop, garage, or camp. It doesn't matter if it's wacky—if it works.

It's the Cats who helped me run an oil line under my house. With only 4″ clearance under the floor, I was stumped until I tied a string to a kitten, dropped it through a hole in the floor, and let its mother coax it out. A rope tied to the string dragged the copper tubing through.—W. L. STRATTON.



Copyrighted material

Surfacing with Power Tools

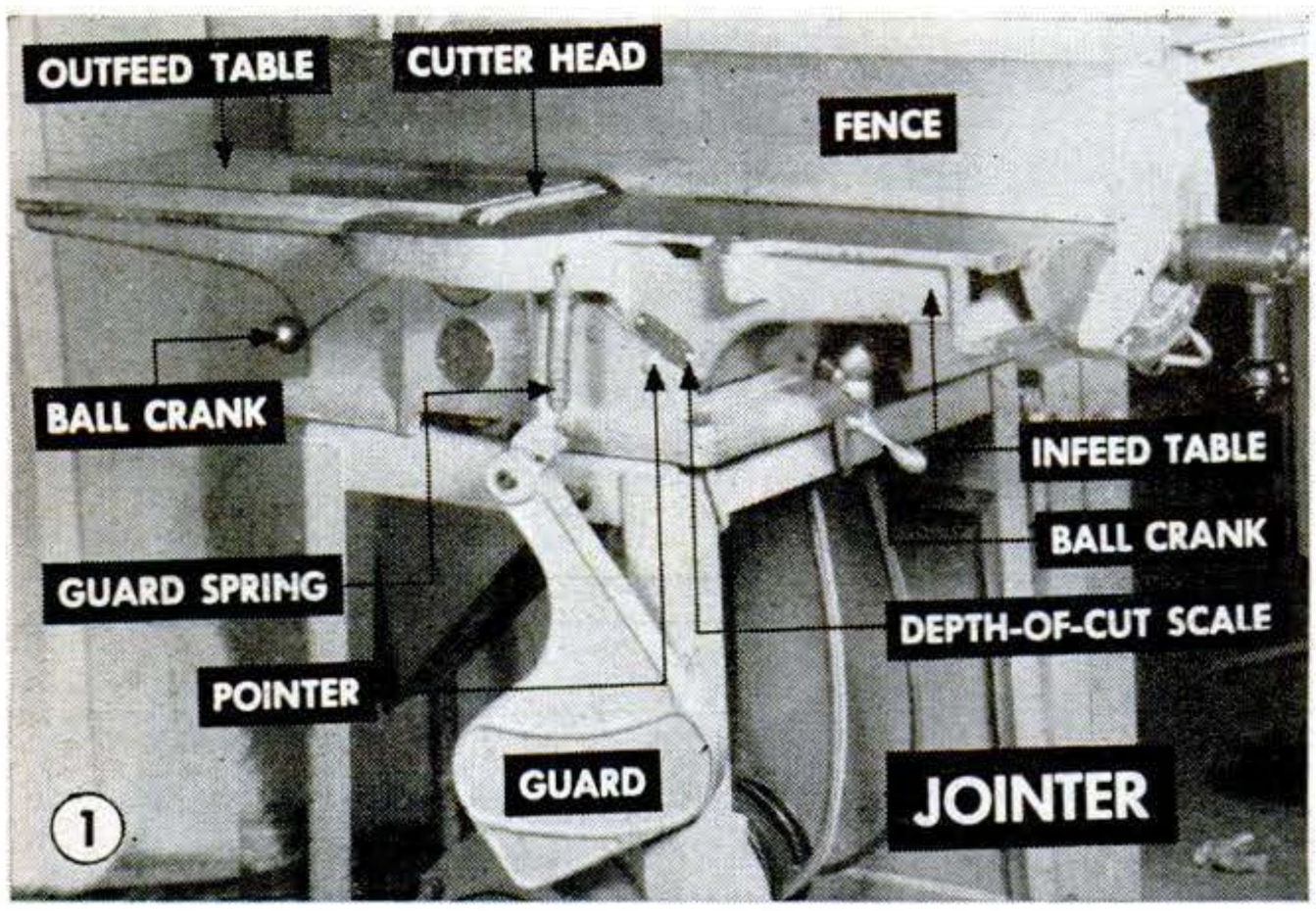
Second in a series on basic jobs in the woodworking shop, this article describes techniques.

By Edwin M. Love

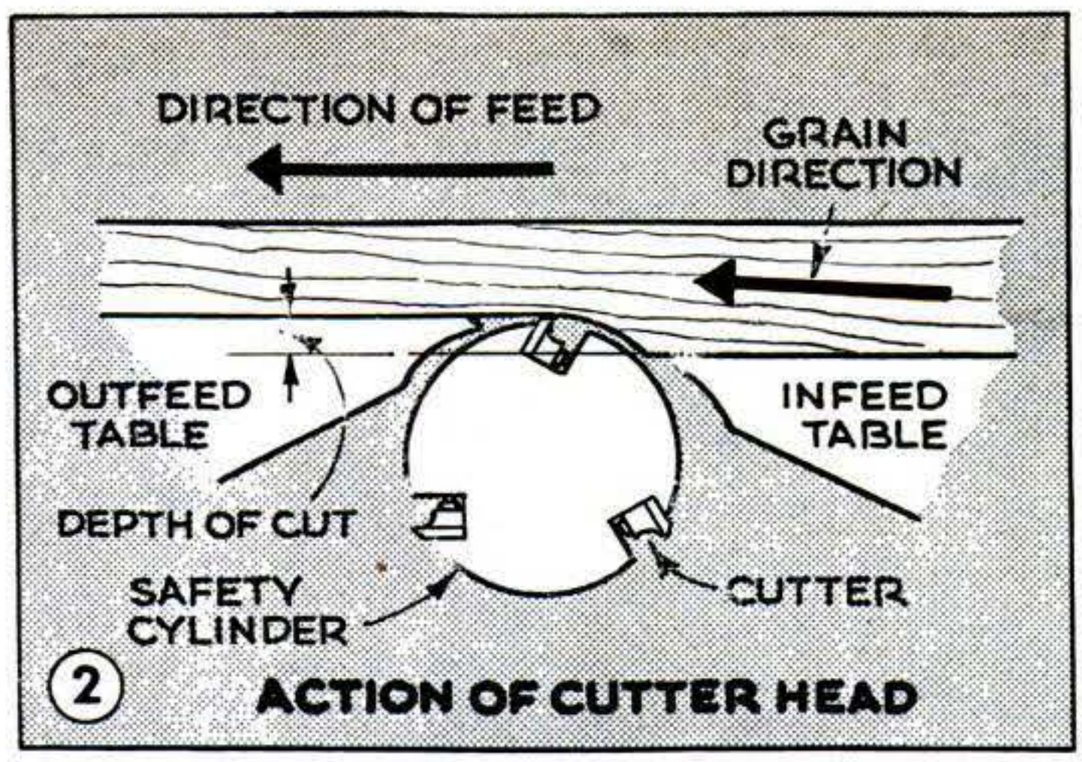
SURFACING a board, frequently a tedious task by hand, can usually be done faster and better by any of several different power tools. While a jointer is primarily designed for working the edges of boards and for truing up square stock, as for table legs, it will surface narrow lumber quickly and can even be used to plane stock wider than the machine. The usual small 4″ or 6″ shop jointer has three keen blades set into a slotted cylinder belted to turn about 4000 r.p.m. An "infeed" table that can be adjusted for depth of cut supports the board as it is fed against the cutter head; an "outfeed" table, set level with the blades at the top of their travel, carries the surfaced end of the board. These parts can be seen in the photo above and in Figs. 1 and 2.

Since such jointers can trim 5/16″ or more from the thickness of a board, it is easy to smooth rough stock with one cut. Loosen the lock screw on the infeed table, lower the table by turning the ball crank beneath it, and check the depth of cut on the scale.

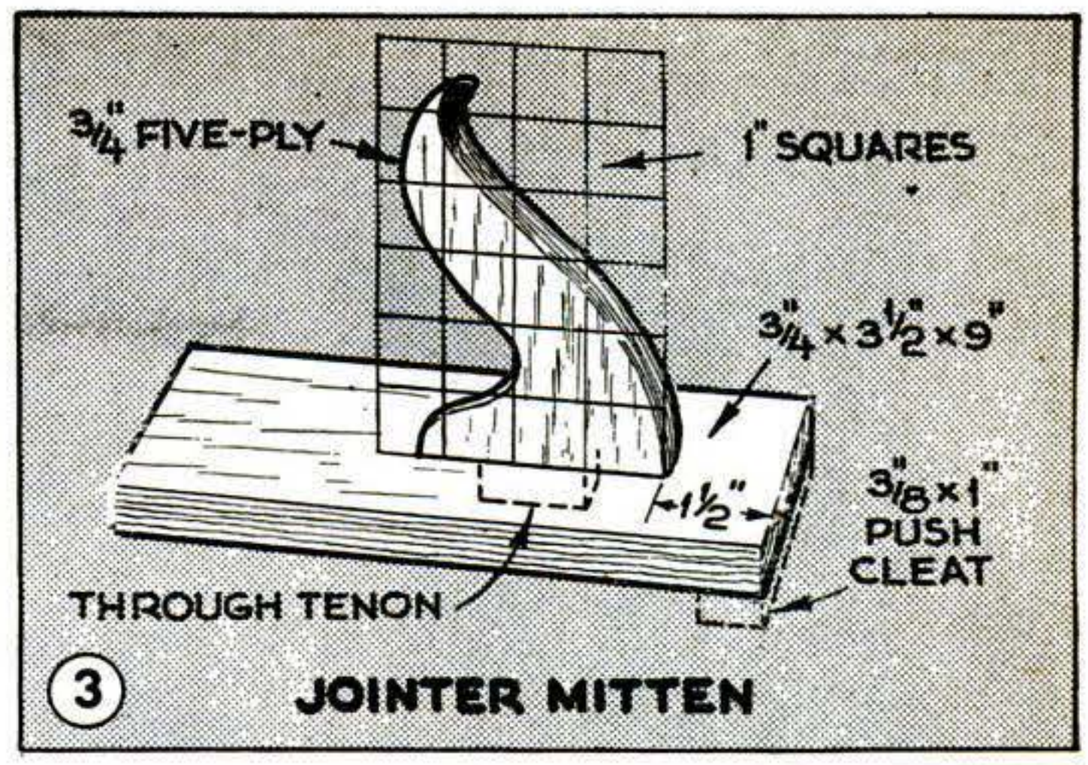
Lumber can be safely fed by hand if it is 1½″ thick or more. Set the fence far enough to the right to allow the full width of the board to pass over the cutter head. Push the wood forward with the right hand while the fingers of the left hold it firmly down on the infeed table. Many workmen consider it poor practice to allow the forward, or left,



Copyrighted material



2 ACTION OF CUTTER HEAD



3 JOINTER MITTEN

hand to follow the board over the blades. Instead, let the hand slide back until the front portion of the board bears on the outfeed table. Then carry the left hand around the side of the jointer and place it on the end. While modern "safety" cutting heads are somewhat less dangerous than the older square type, it is only common sense to keep the guard in place whenever possible.

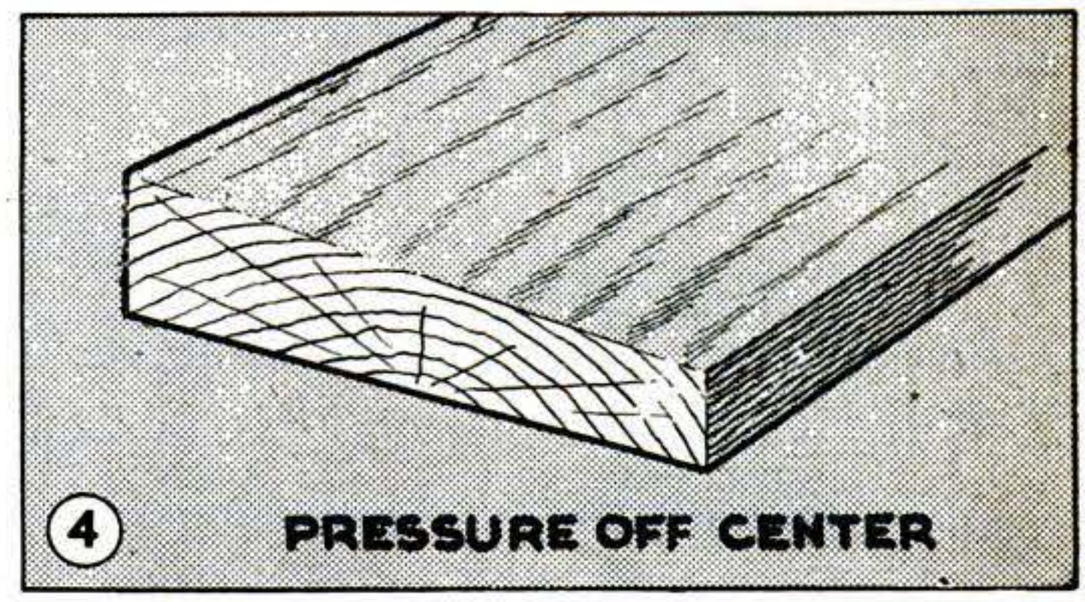
A pair of "mittens," or push blocks, is good safety insurance, and indispensable for thin stock. To make them, mortise comfortable handles into bases big enough to shield the hands, as shown in Fig. 3. The push cleat is attached only to the follower mitten.

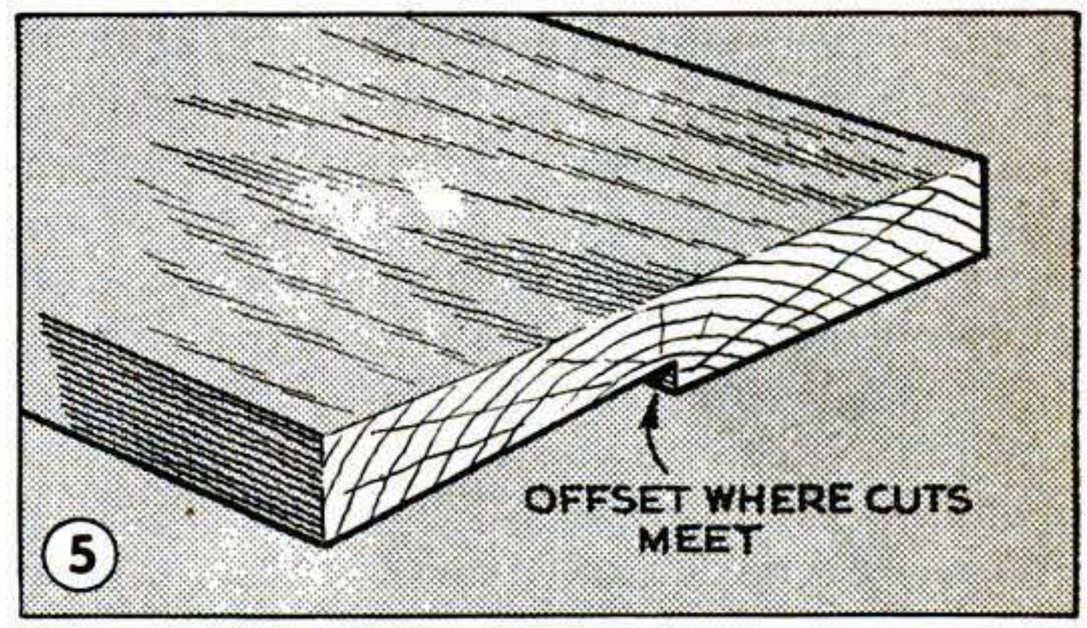
Twisted wood must be jointed with pressure on the high corners to keep the piece from rolling with the twist. It is advisable to make a short pass or two to reduce the high corners, or to take a cut from the convex center of a board so the entire board can be passed over the cutters without rolling out of level.

Since the cutter action tends to lift the work, pressure applied at one edge causes that side to cut faster than the other, giving the board a wedge section (Fig. 4). A wide board can be smoothed fairly well by passing half the width over the machine, turning it end for end, and planing the other half. Distribute the pressure evenly, or a deep offset, as shown in Fig. 5, will remain where the two cuts overlap. A fine cut reduces such a difference, but it is seldom possible to prevent it entirely.

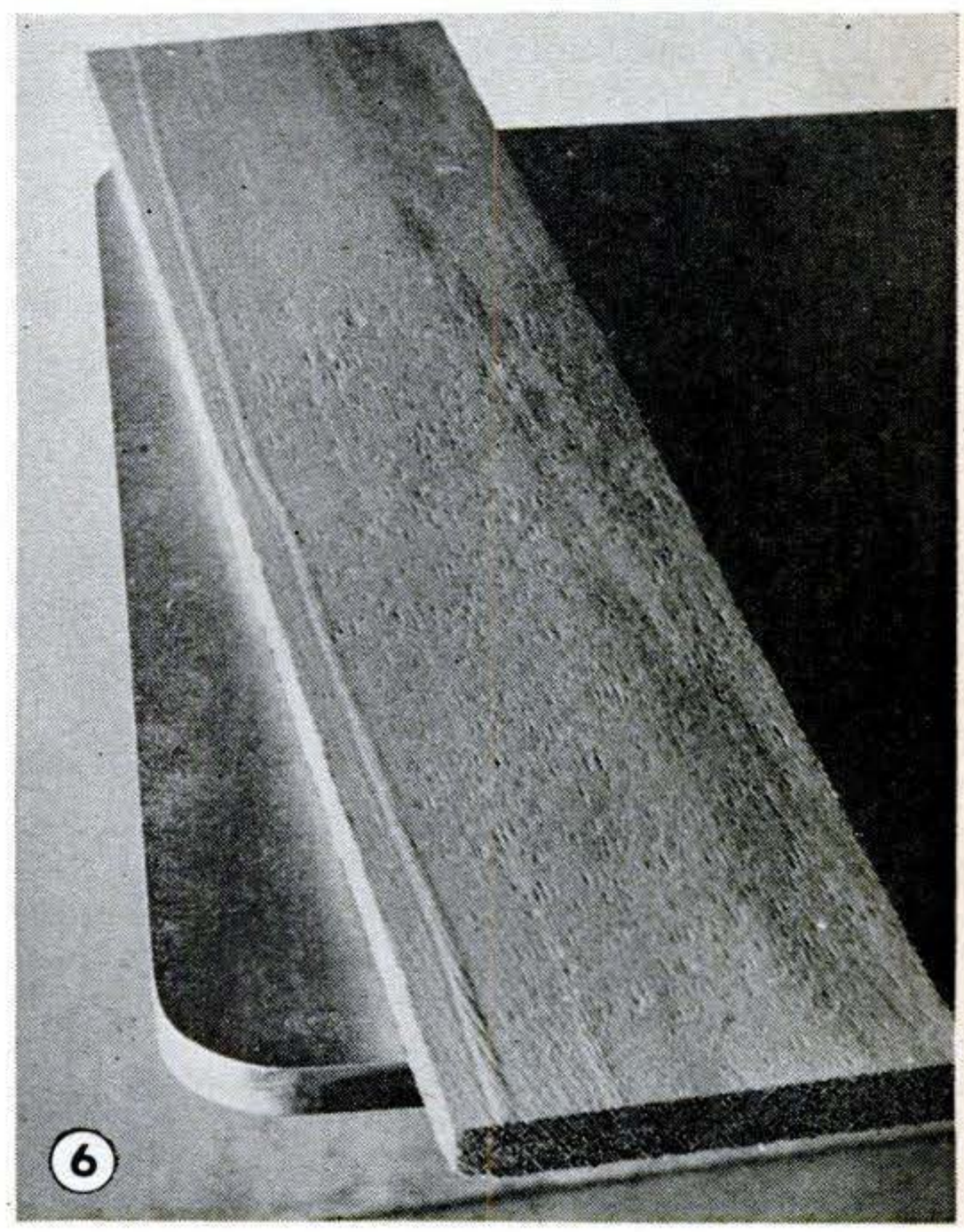
The cutter blades stay sharp longer if you plane only clean stock without dirt, imbedded nails, or screws. Clean out the shaving chute occasionally, for if it clogs, the cutter head will throw shavings out on the table. Shavings driven into the surface will cause bruising and pockmarking even on hardwood (Fig. 6).

Excellent surfacing jobs can be done with

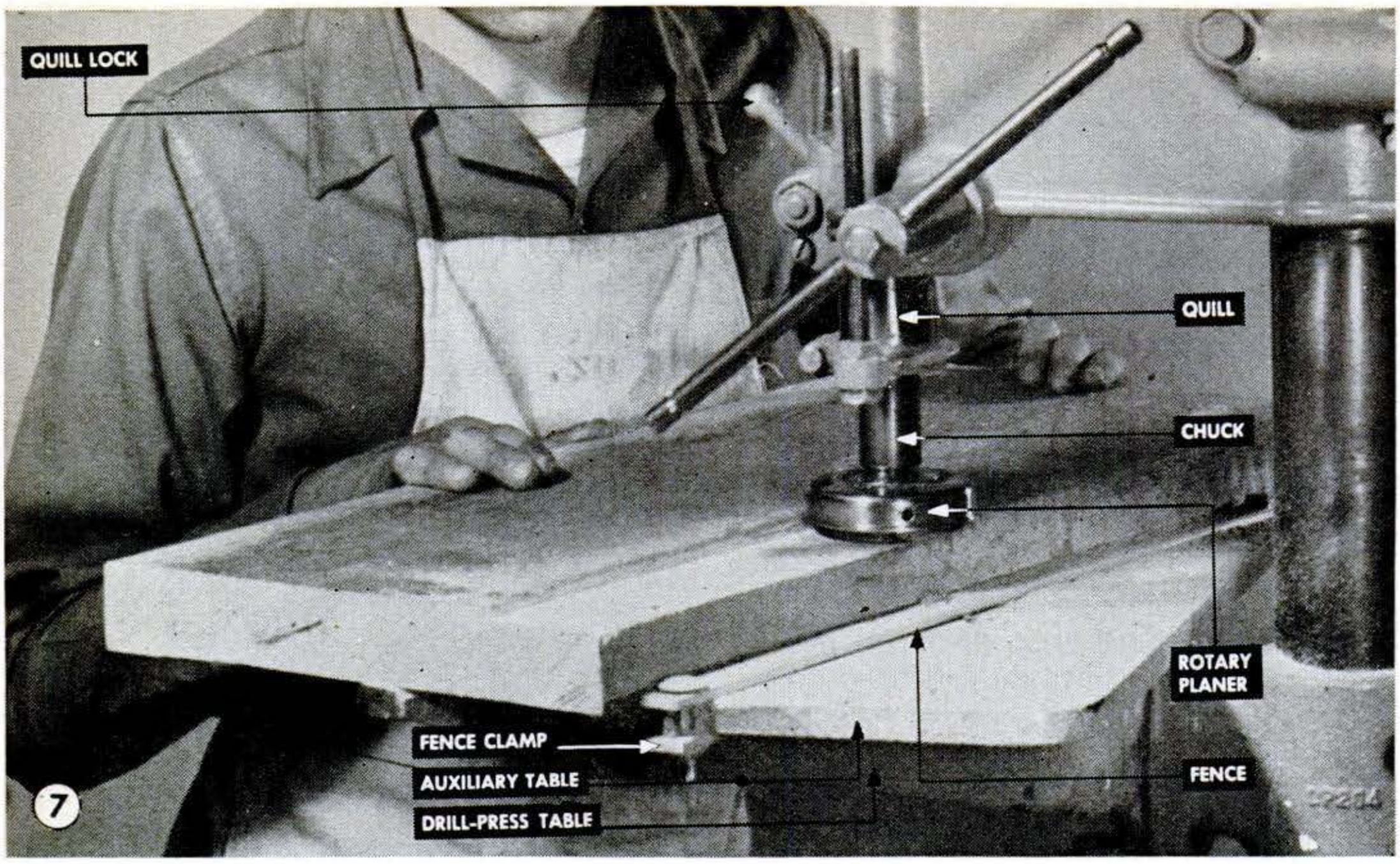

4 PRESSURE OFF CENTER



5


6

Copyrighted material

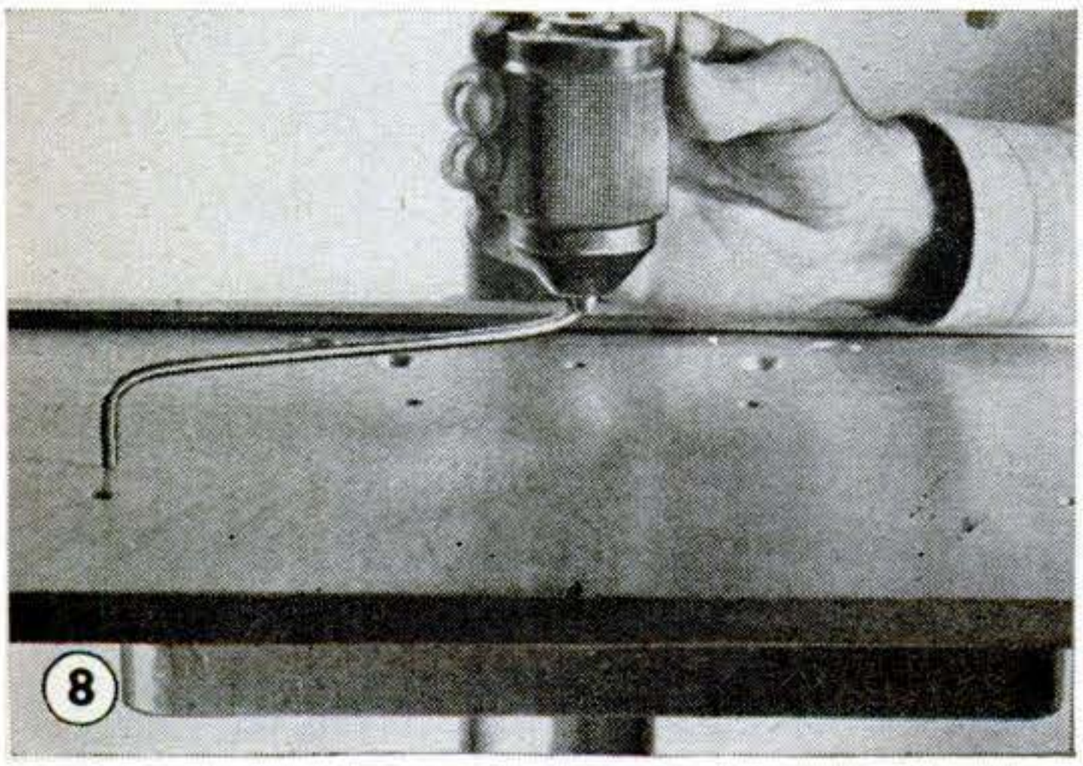


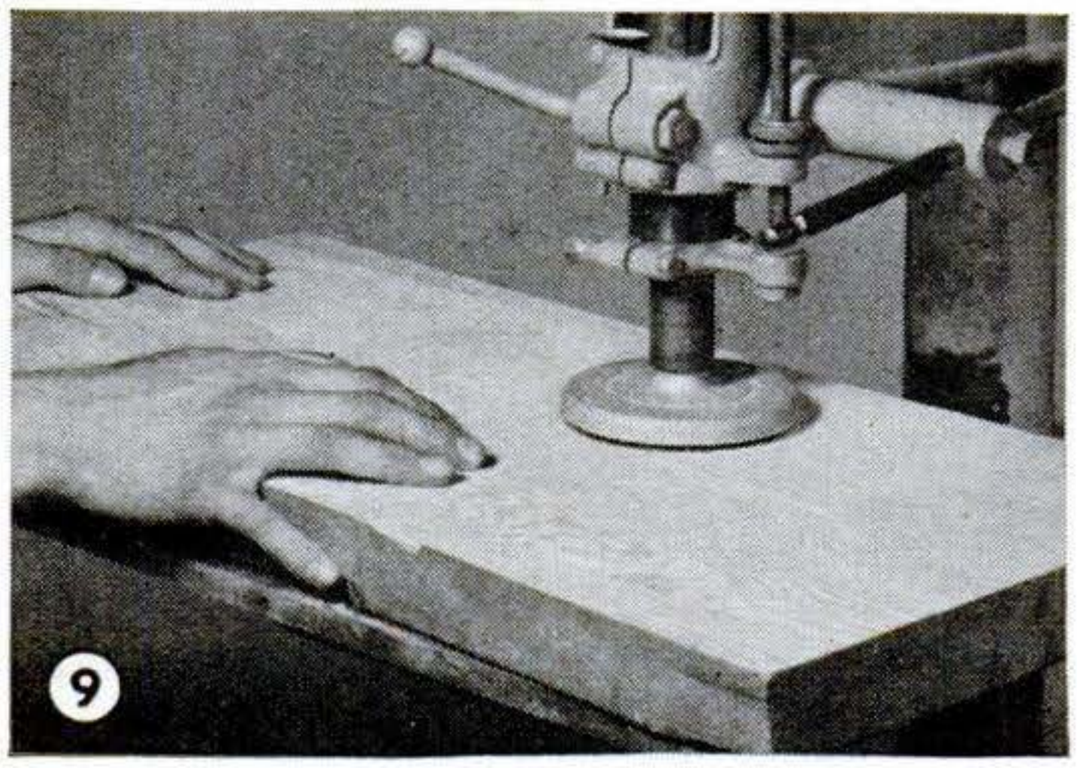
a rotary planer used in a drill press, as illustrated in Fig. 7. A typical tool of this kind has three small blades, ground sharp on the outer and lower edges, clamped in an aluminum body. Insert the planer in the drill chuck or attach it to a Morse taper spindle adapter. With the quill at the top, adjust the height of the table so that the board resting on it is about ¼″ below the blades. Across the back of the table clamp a strip of wood for a fence, placing it so that the planer will overhang the edge of the work slightly. Lower the planer to a point where the cutters will bite deeply enough to remove the entire surface.

Pass the board evenly from left to right under the planer while forcing it against the fence. Lifting an end or edge causes gouging. For the second pass move the fence back and repeat the operation. When the center of the board is reached, turn it end for end and repeat. After a little practice the fence can be dispensed with.

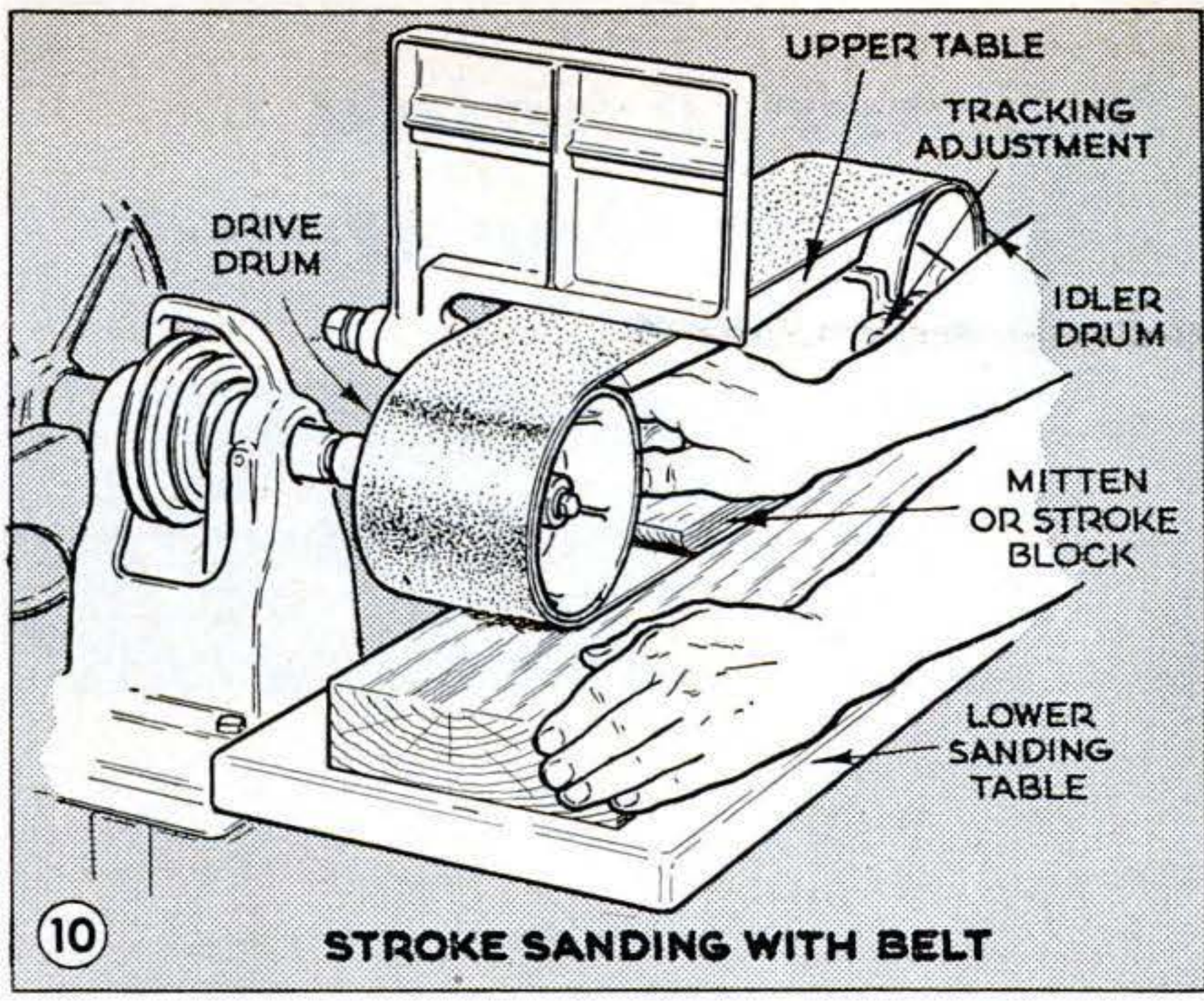
Burning may result if the blades are dull or the feed is too slow. Striations or circular scratches bulging toward either side show that that edge of the table is slightly higher than the other. To remedy this, remove the table pin, loosen the lock nut a trifle, and strike the high edge with the hand. Tighten the nut and try a new cut or test the table for levelness by using a wire with a double bend, as shown in Fig. 8. As the chuck is turned, the tip of the wire rubs the high spots. The table of an old drill press may be worn down at the edges, causing uneven cuts. One cure is to clamp on a flat board as an auxiliary table, shimming it up with paper or cardboard at the low parts.

Sanding on a drill press is an operation





Copyrighted material



10 STROKE SANDING WITH BELT

11

similar to planing. Rest a planed board on the table and lower the sander to touch it. The pressure should be light enough to permit the piece to be drawn from under the sander while it is stationary. Set the speed fairly high and pass. the board smoothly beneath the sander (Fig. 9). Rough boards can also be sanded, but the paper grit is conserved by planing the board first. Burning may be caused by too high a speed, clogged paper, slow feed, or a combination of these faults.

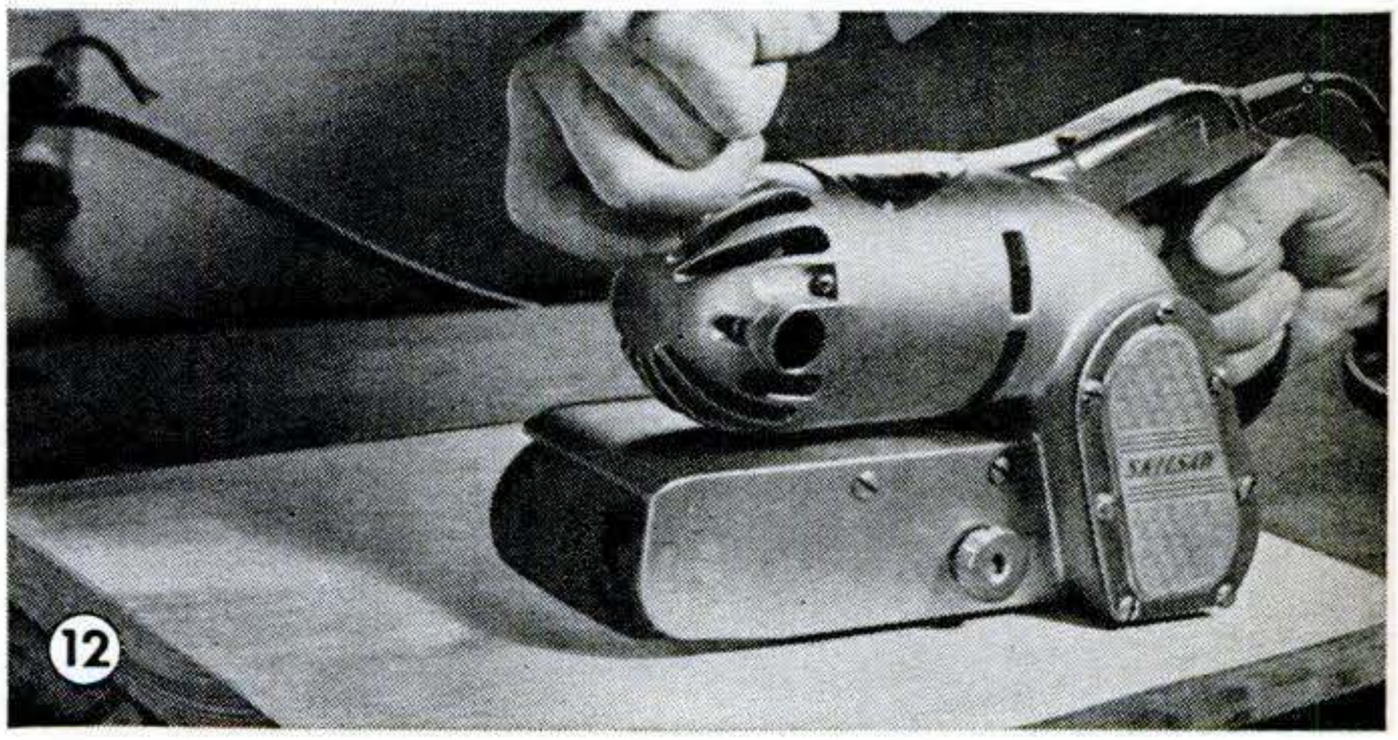
A fast and thorough job of sanding can be done with a belt sander. Such a machine has a sandpaper belt passing over two pulleys that are adjustable for tension and alignment. Small machines have a flat backing plate below the upper side of the belt, while some have a table below the belt in addition. To use the upper table, rest the board lightly on the moving belt and stroke it evenly from end to end. Avoid rocking it over the ends, since this hollows the board. If the lumber is wider than the belt, move it sidewise progressively to give even sanding over the entire face. Use the fence, or dam, whenever work permits.

Sanding beneath is accomplished by resting the board on the adjustable lower table and stroking it with a mitten pressed on the back of the belt (Fig. 10). Lower the mitten gradually and lift it easily at the end of the board or stroke. Move the board for another stroke. If a finishing cut with a fine-grit belt is taken, little hand work is needed to prepare for a high-grade paint or varnish job.

Pieces of wood short enough to hold against a disk sander with little or no projection beyond the edge are readily surfaced by grasping the piece (Fig. 11) and moving it around over the disk. Remember that the edge of the disk travels faster than the center and in consequence cuts faster. Be sure to hold the work firmly, especially if you don't keep it down on the table. The reason for this is that if it should grab while bearing against the rising half of the disk, it may be pulled from your grasp. In general keep work on the table, in contact with just the downward-moving part of the disk.

A typical portable belt sander, illustrated in Fig. 12, is used much like a hand plane. It is raised at the end of the stroke, but unlike the plane, it must not be allowed to pause at any point in its progress from one end of the board to the other, since the belt cuts continually whether the body moves or not.

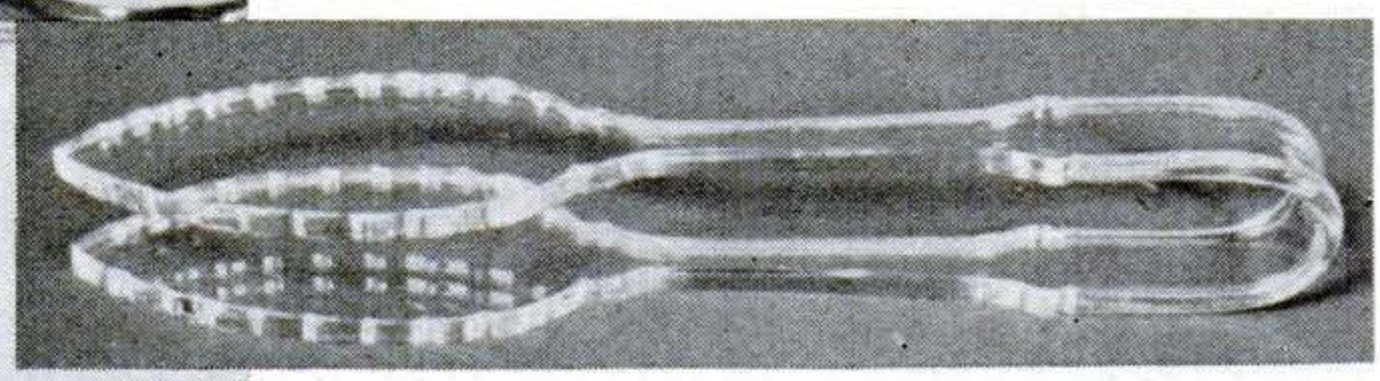
TO BE CONTINUED



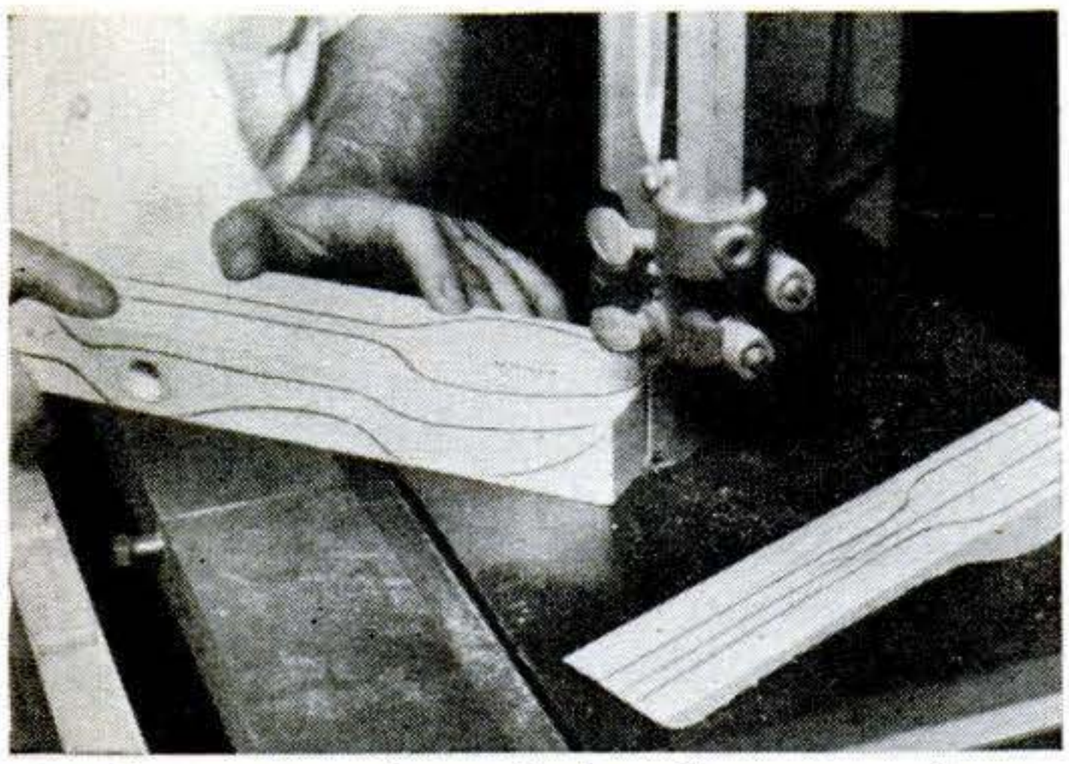
12

Copyrighted material

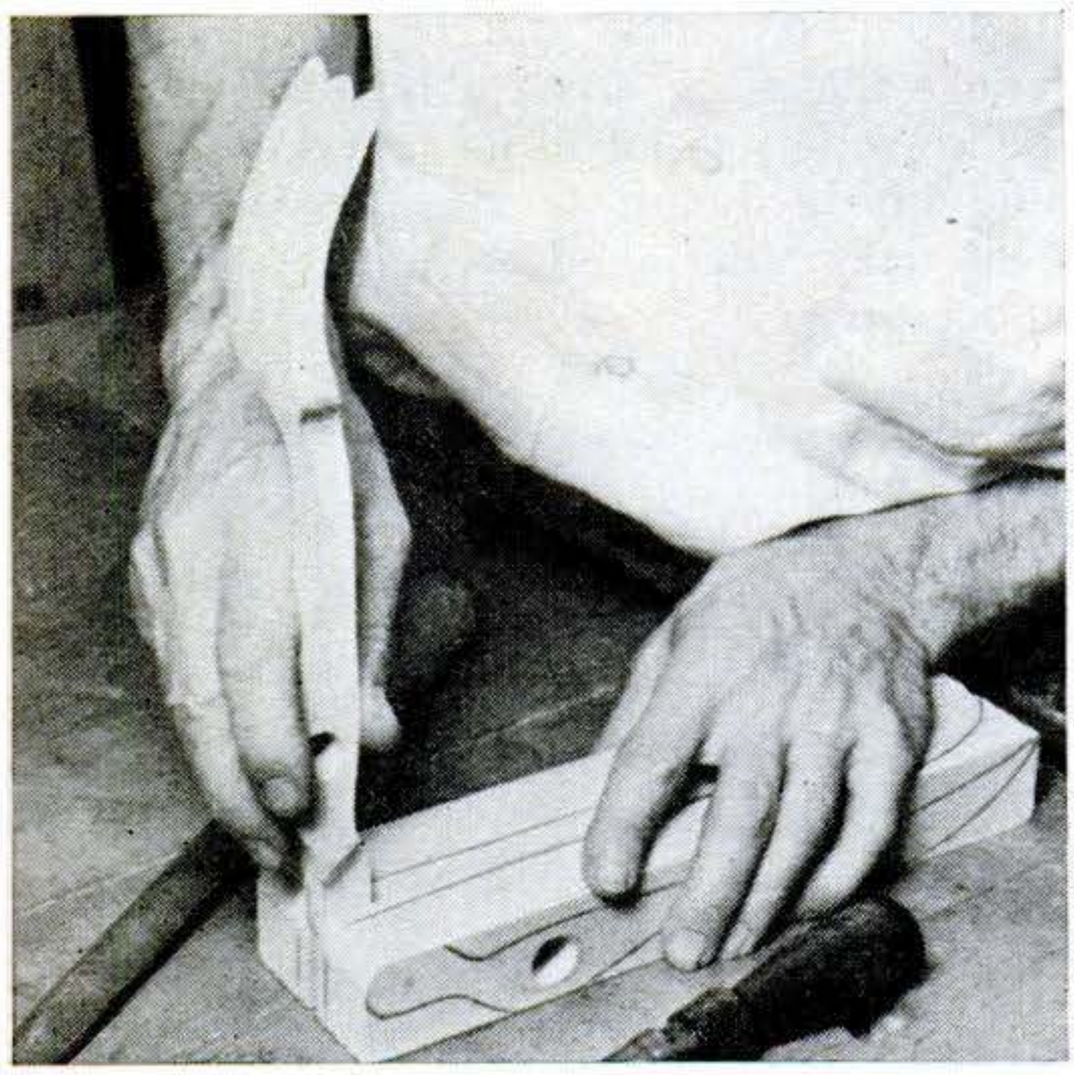
Serve Salad with One Hand



By John P. Arnold



Band sawing reduces fork and spoon to shapes that can be readily completed with hand tools.



Fit the scissor joint at an early stage. Keep both pieces in square form as long as possible.

INSTEAD of struggling with slippery wisps of lettuce when serving guests, you can be nonchalant when dishing out the green stuff with this scissorslike gadget. It won't let you down. The plastic tongs, a good companion piece, are just right for asparagus.

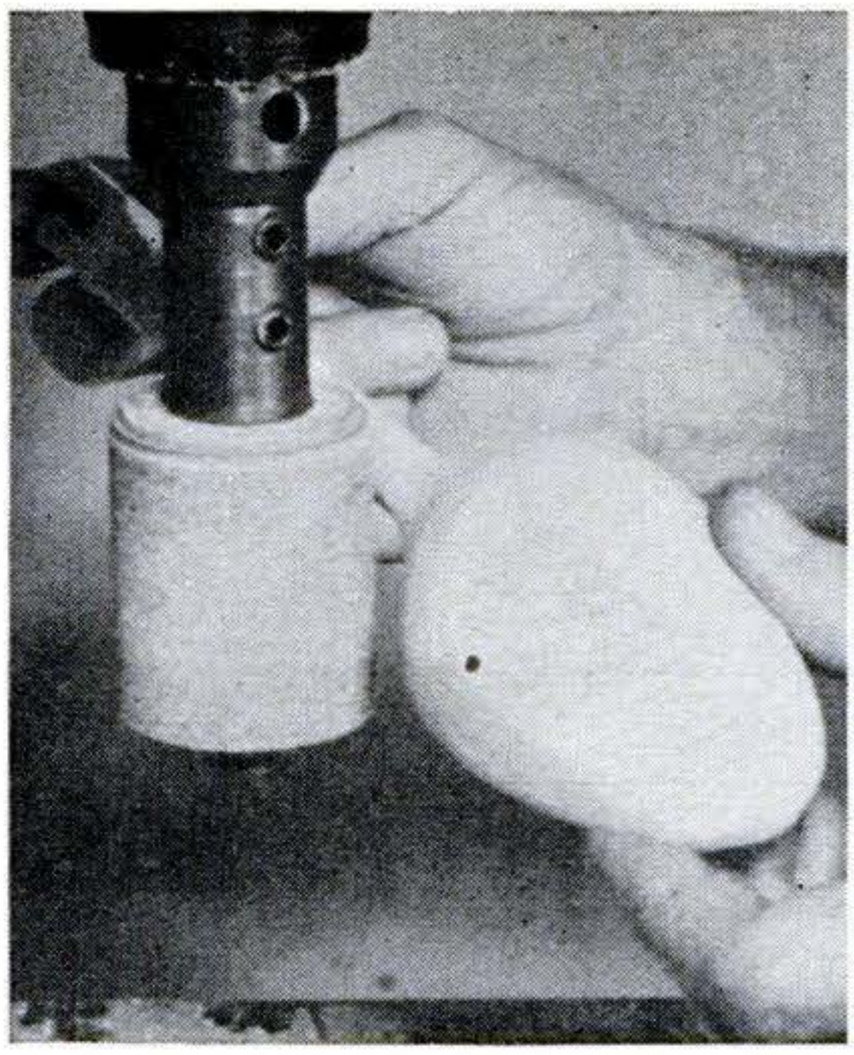
For the salad server, you'll need two blocks of rock maple, Osage orange, or other straight-grained hardwood that has exceptional strength in thin cross section. Shaping can be done entirely with a knife or two, a rasp, and sandpaper, but a bandsaw and sanding drum will speed the work considerably.

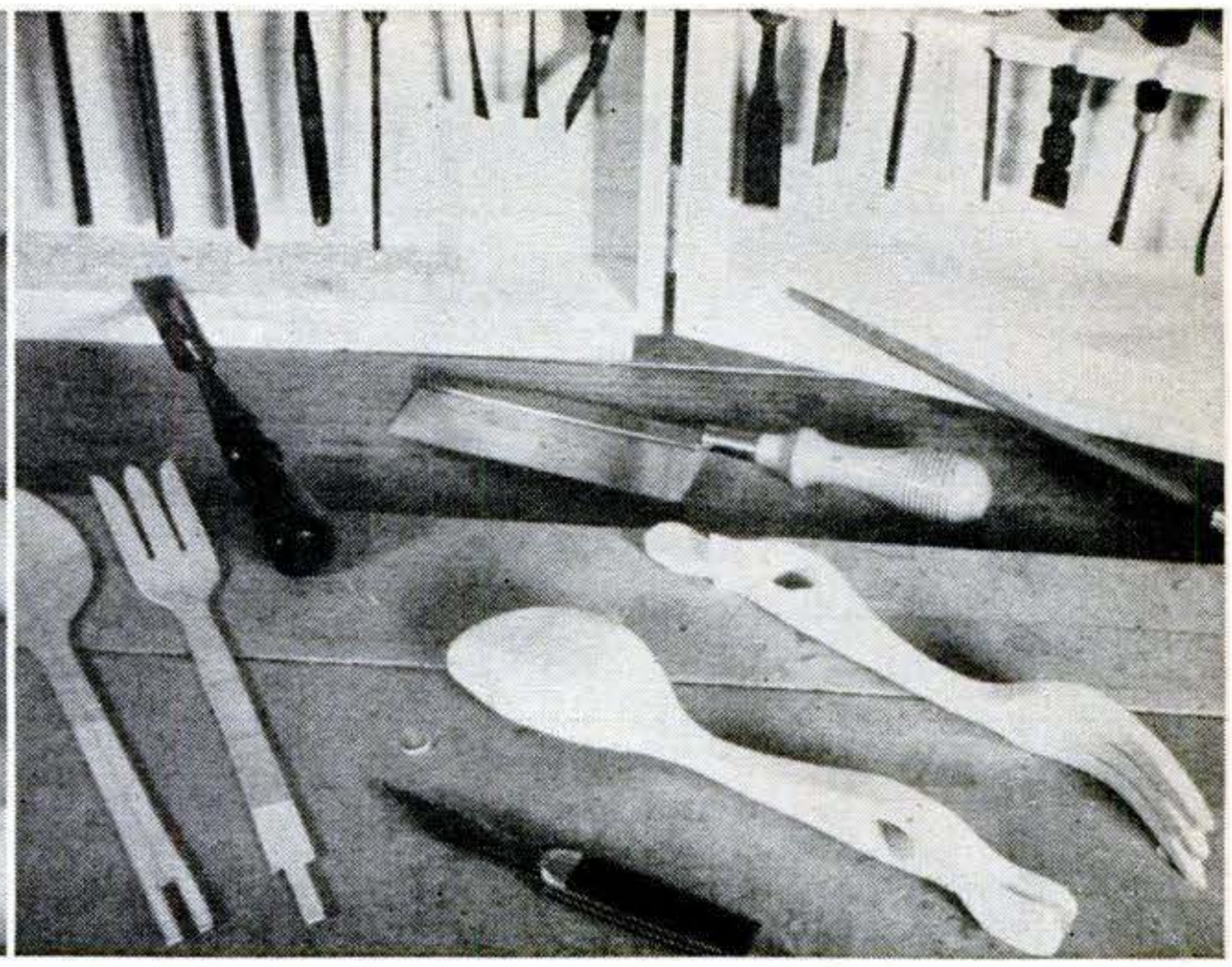
Trace top and side outlines on paper and transfer them with carbon paper to the stock—or, if you plan to make several servers, cut templates of the outlines out of thin plywood, cardboard, or fiber. Roughly bandsaw the plan or top outline of each piece. Then brad the waste back in place and saw the side profiles. In sawing, leave plenty of material around the joint. When finished this should fit tightly.

Keep the pieces in the square as long as possible, working over the surfaces generally, hollowing the inside of the spoon, enlarging the finger grips, and fitting the joint. Then bring all parts down to the finished dimensions, using extreme care while shaping the tines of the fork.

Join the spoon and fork with an ornamental pin, threading the shaft and tapping the knob so that the two members may be taken apart for cleaning. The pivot pin

Copyrighted material

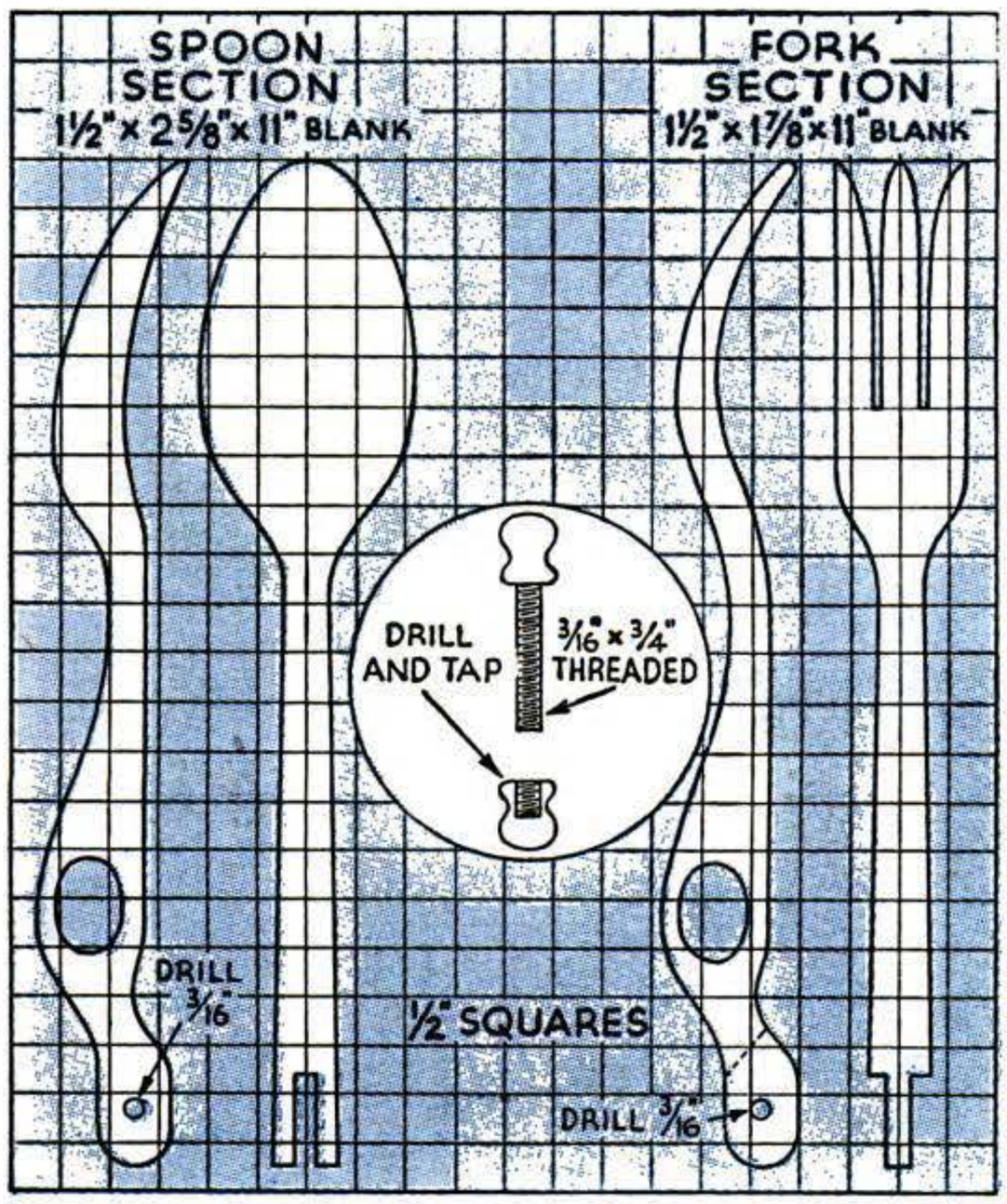




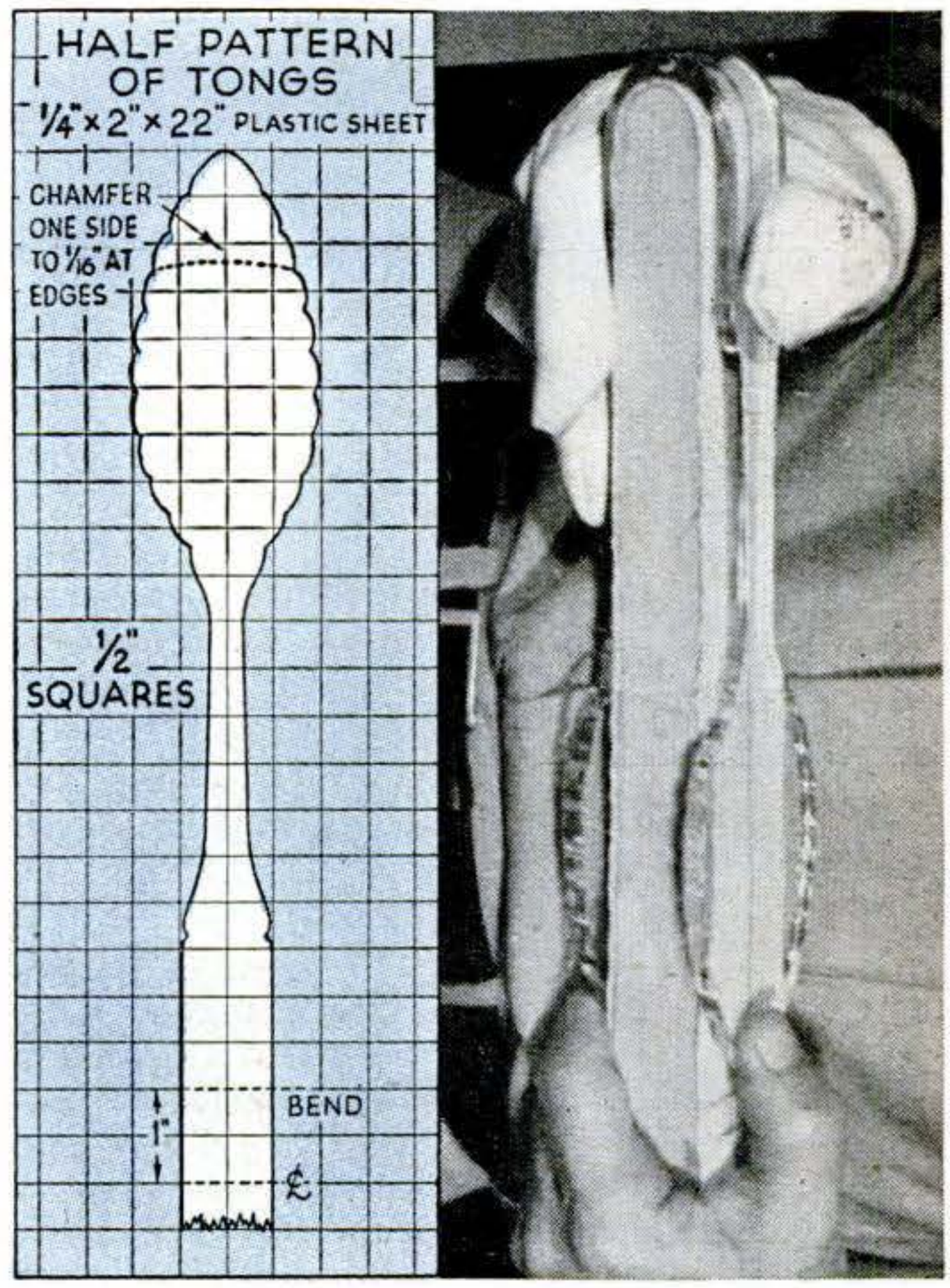
A sanding drum on the drillpress helps smooth the contours of the roughly finished fork and spoon. The final shaping is done with chisels, gouges, and sandpaper. Above right are the tools, profile templates, and the shaped parts ready for final carving and finishing.

might be made from metal, plastic, or ivory —or perhaps you can find something suitable in the scrap box. Finish the wooden parts by rubbing olive oil in freely.

The clear-plastic tongs do not have any ornamentation other than a pleasing outline and scalloped edges. After jigsawing the blank from ¼″ clear plastic, polish it, heat in an oven, and shape it over a flannel-covered wood block, holding it until almost cool. The wood form should taper in thickness from 1″ at the end around which the plastic is bent to 2″ at the other. This will give the tongs a V-shape and therefore the requisite spring to open when released. If you do not get the desired shape the first time, the plastic may be reheated and re-formed. The tips should be thinned down as specified in the drawing for appearance and for greater convenience in use.

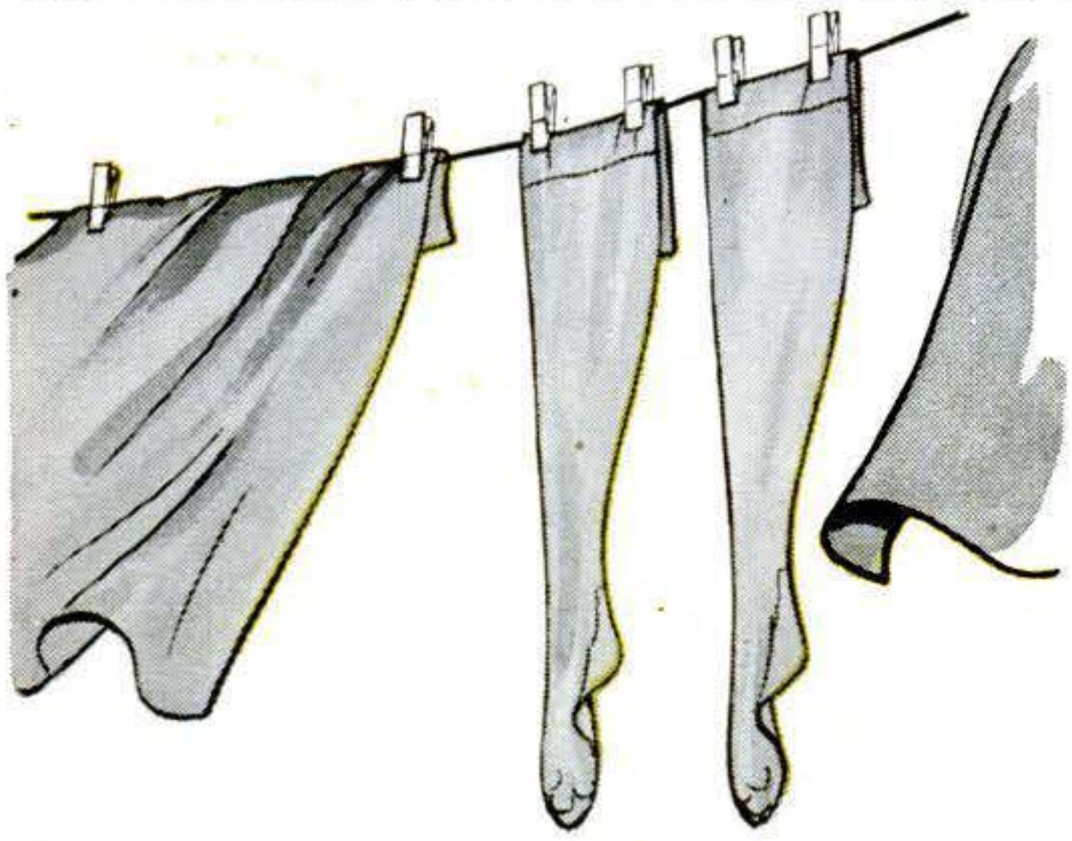


Top and side profiles of the server parts appear above. Bend the heat-softened plastic tongs over a tapered wood form as at the right.

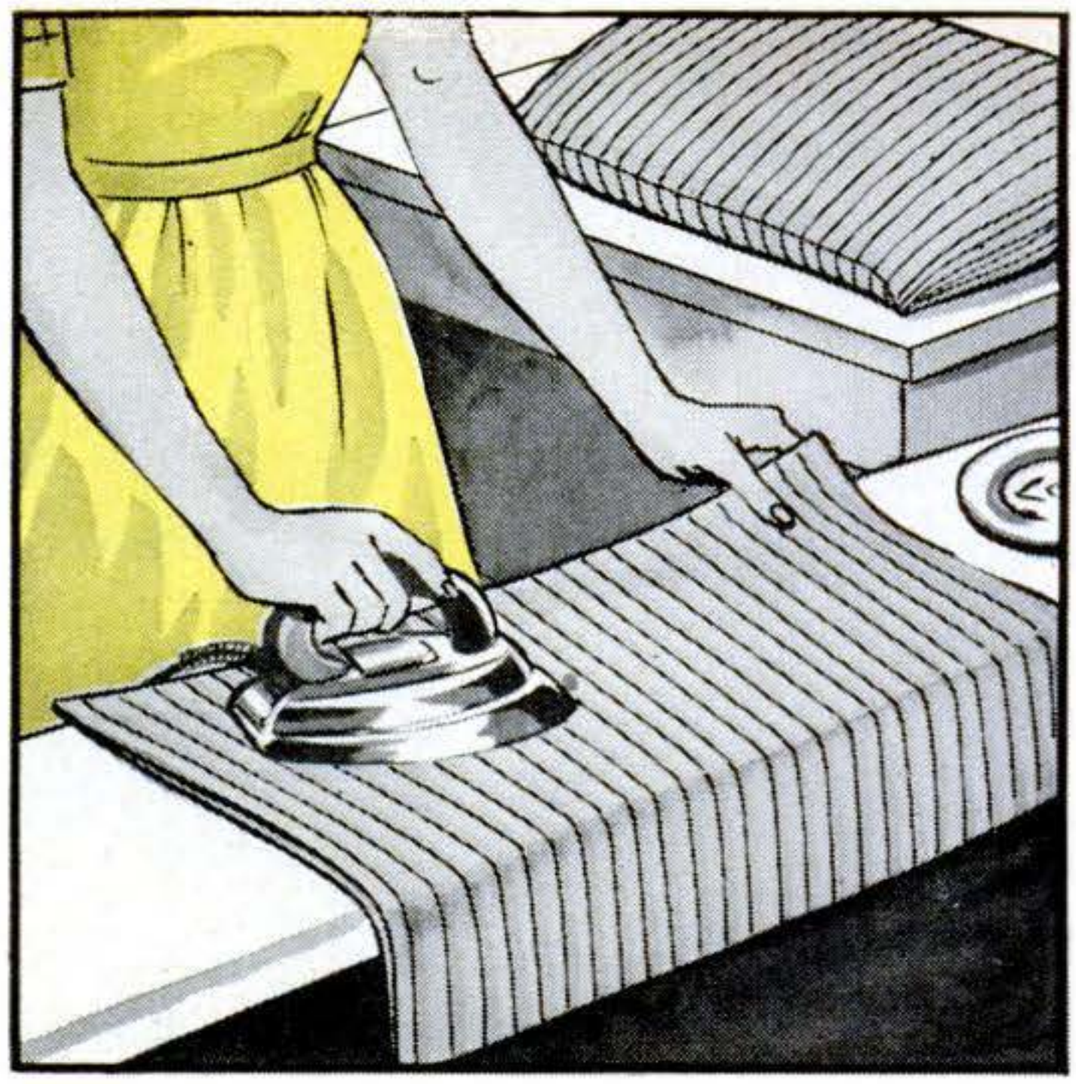


Copyrighted material

KEEPING THE HOME SHIPSHAPE

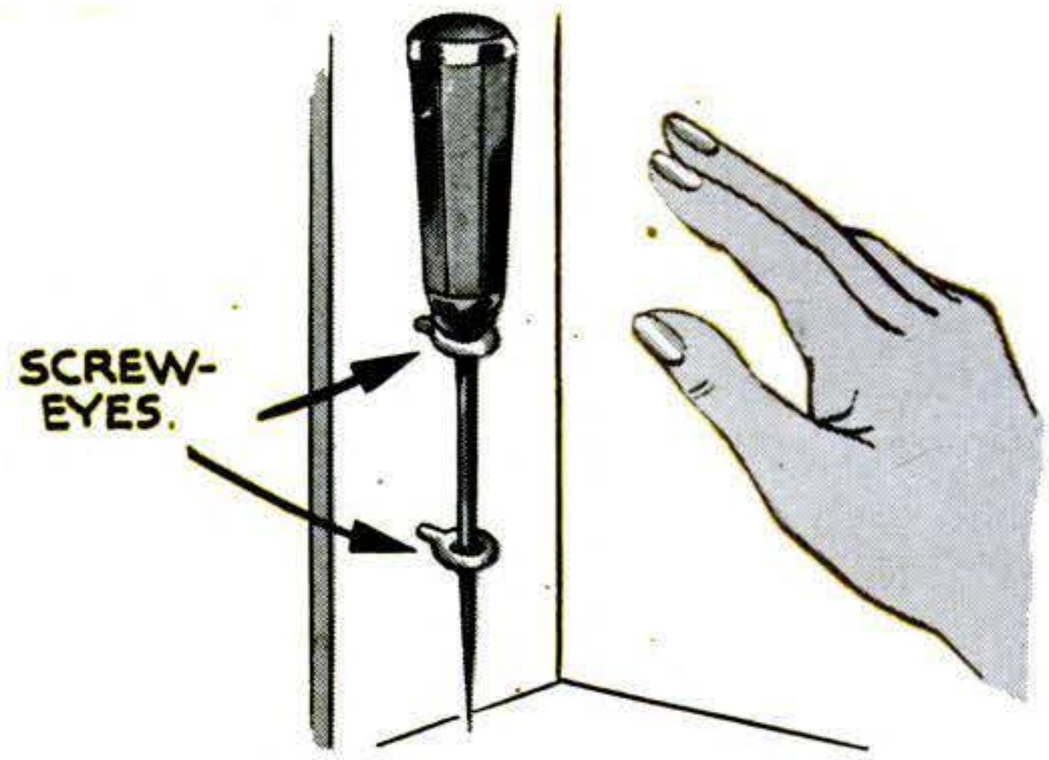


Sheer stockings can be dried out of doors even on windy days. A few marbles dropped into the toe of each keep them from whipping about.

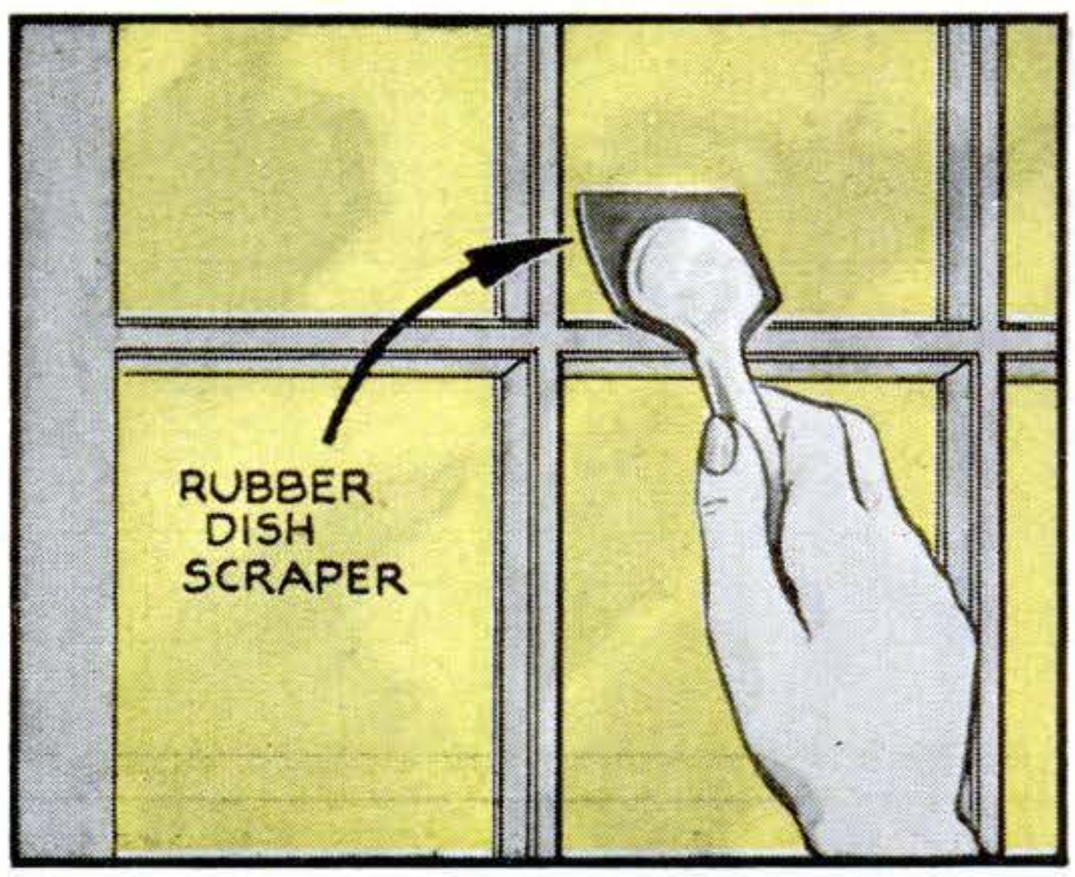


To keep feathers from working through pillow ticking, run a waxed iron over the inside of new ticking before filling it with feathers.

A pie plate pivoted on a nail or wood screw makes a handy revolving tray for spices. Mount it on a kitchen shelf with a washer between, letting it overhang to make it easier to spin.

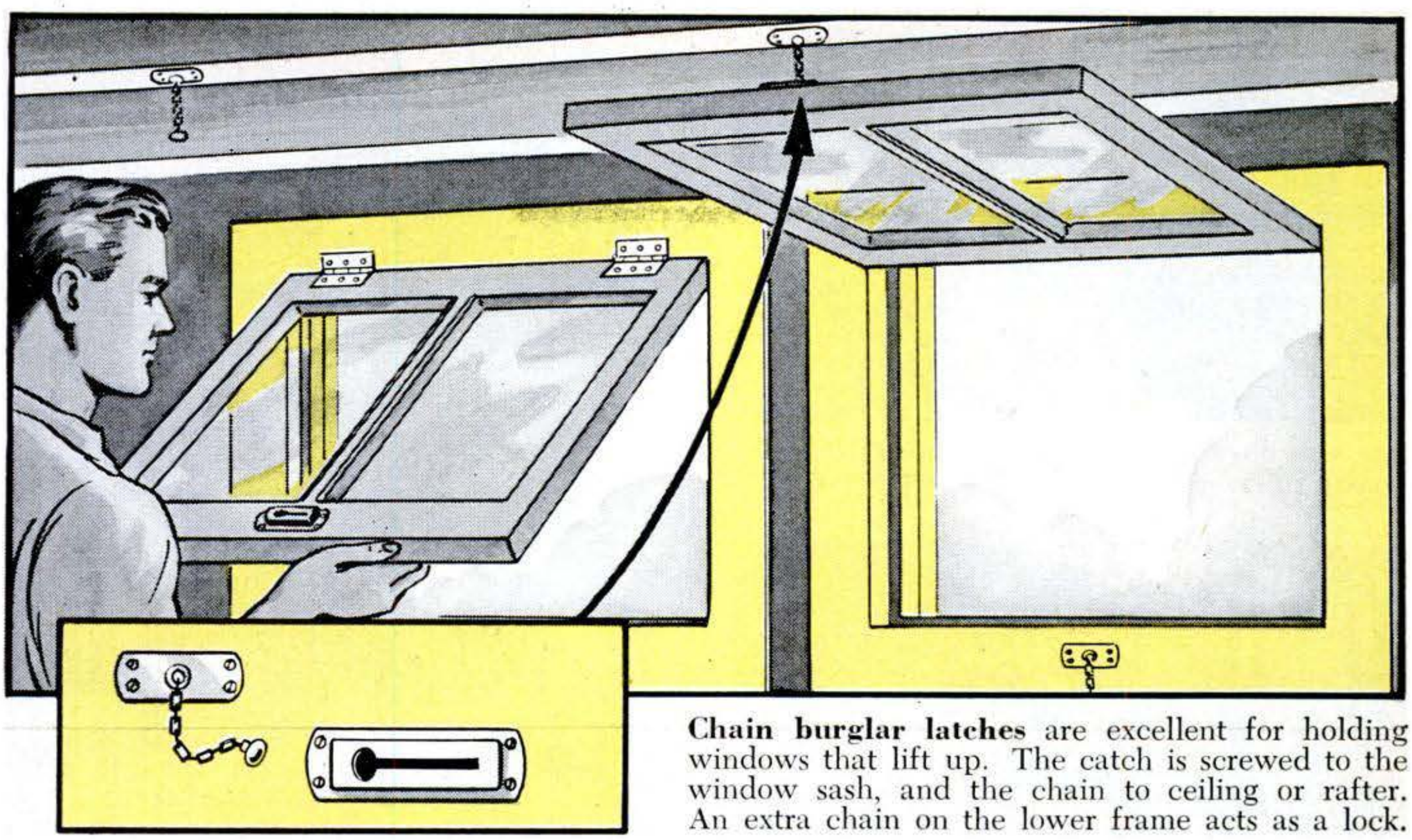


An ice pick can be dangerous if left lying in a drawer with other utensils. Two screw eyes placed about 3″ apart at the back of a shelf or inside a cupboard make a much safer holder.

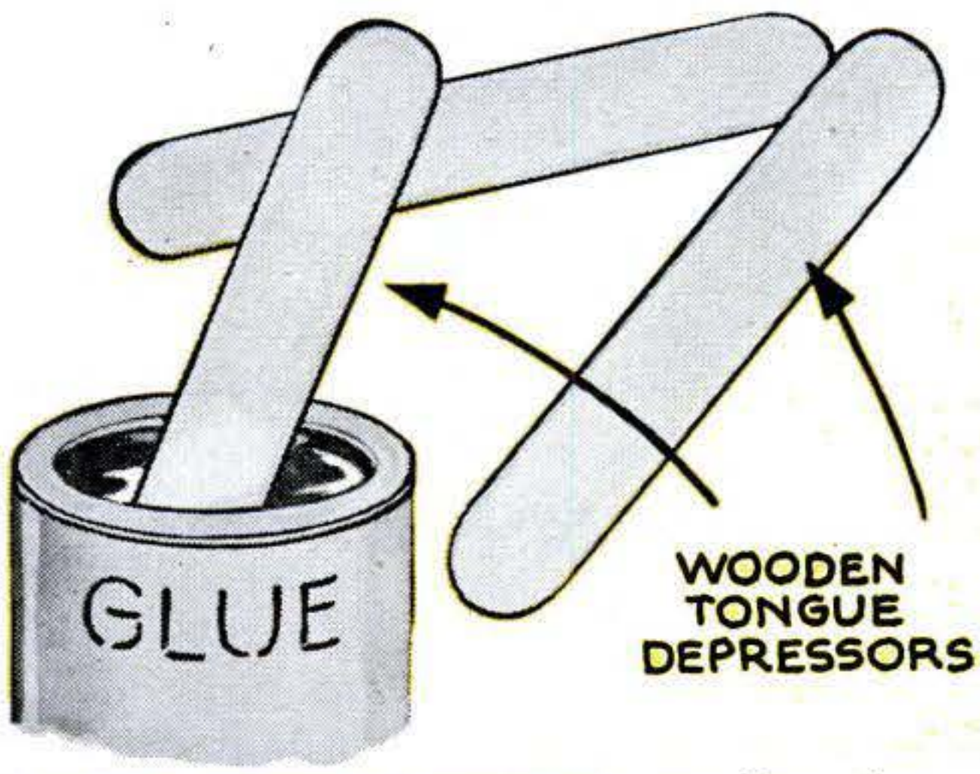


When washing small windowpanes, use a rubber dish scraper as a squeegee. It fits between frames that are too narrow for a regular wiper, yet does a thorough job in all the corners.

Copyrighted material

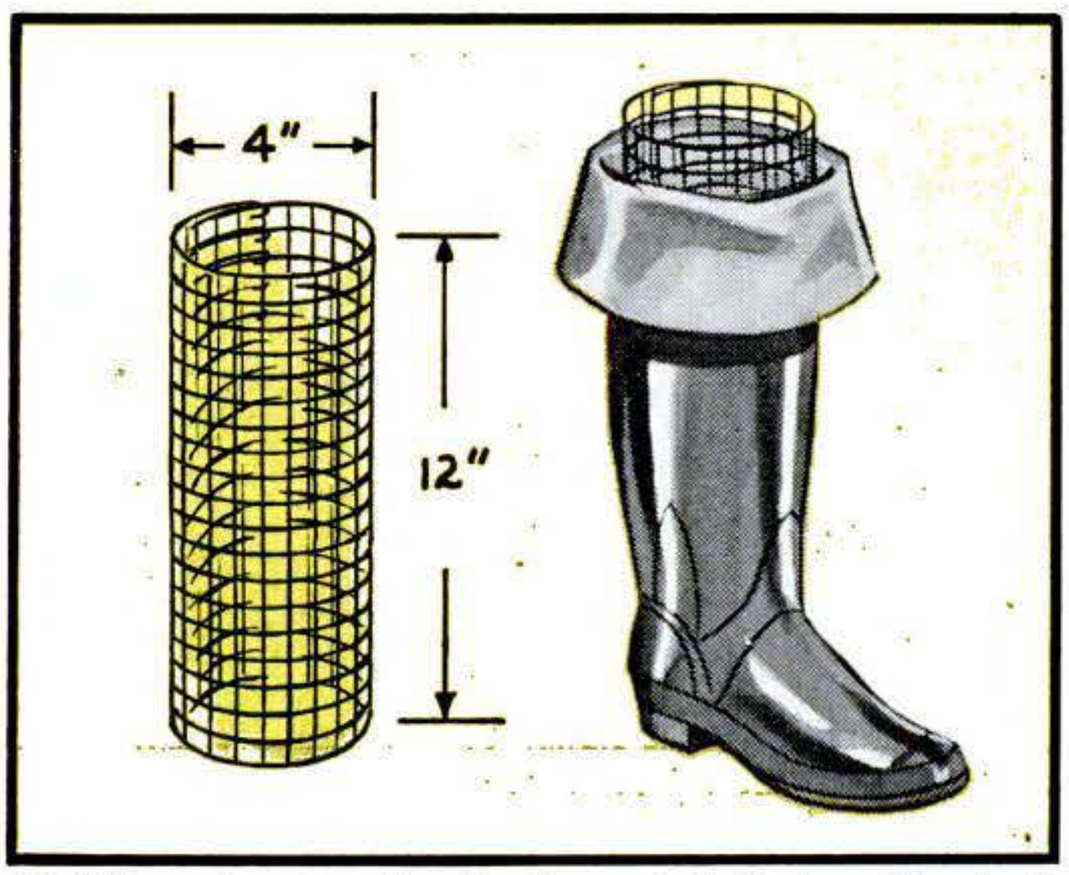


Chain burglar latches are excellent for holding windows that lift up. The catch is screwed to the window sash, and the chain to ceiling or rafter. An extra chain on the lower frame acts as a lock.



Wooden tongue depressors are fine glue applicators and paint stirrers. Available at most drugstores, they're so cheap you can throw 'em away after use. If too wide, they split easily.

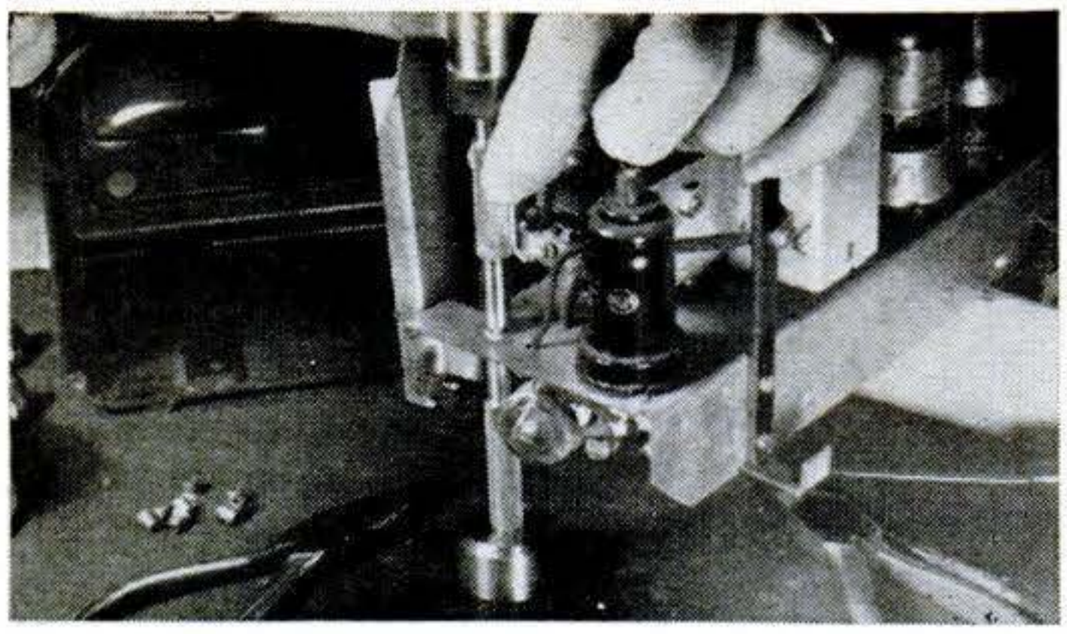
Small touch-up paint jobs are often postponed because of the labor of cleaning brushes afterwards. Paste a memo on the paint can you will use so you'll remember to do all jobs at once.



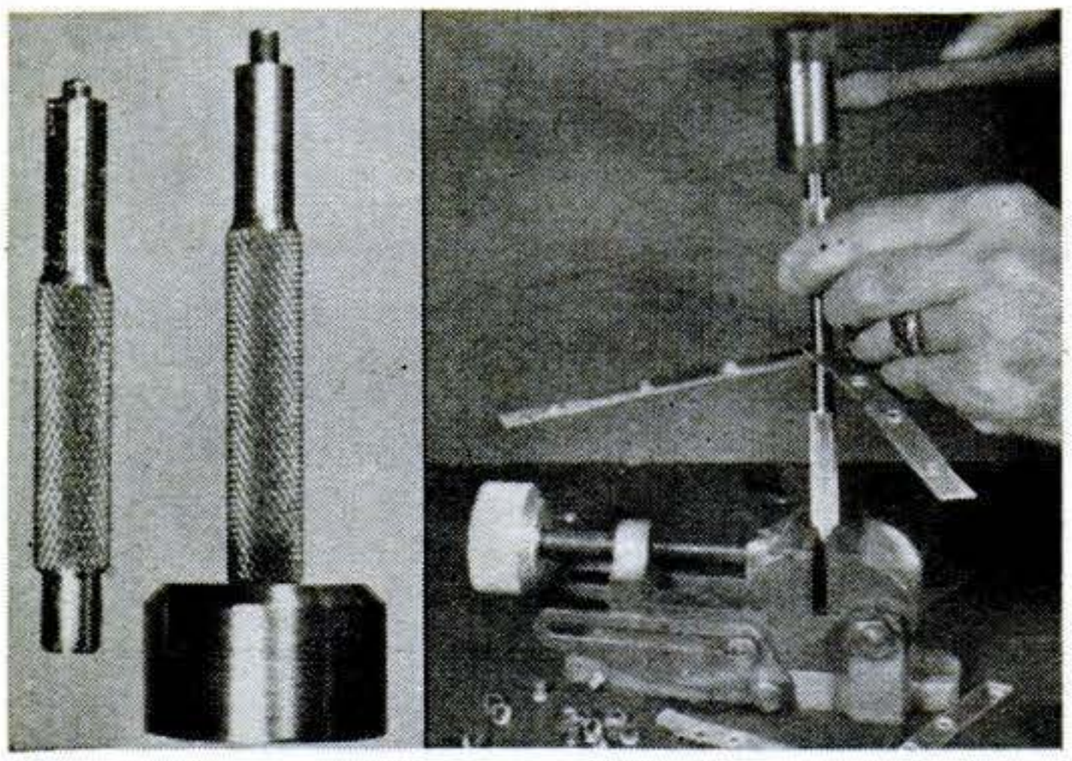
Rubber boots dry better and faster if air is allowed to circulate in them. This is aided by a cylinder of hardware cloth inserted in each. Turn inward any sharp wire ends or edges first.

Collapsible tubes holding cement, glue, and wood putty can be securely resealed after opening with small cup hooks as above. The hooks also serve for hanging the tubes on a wall.

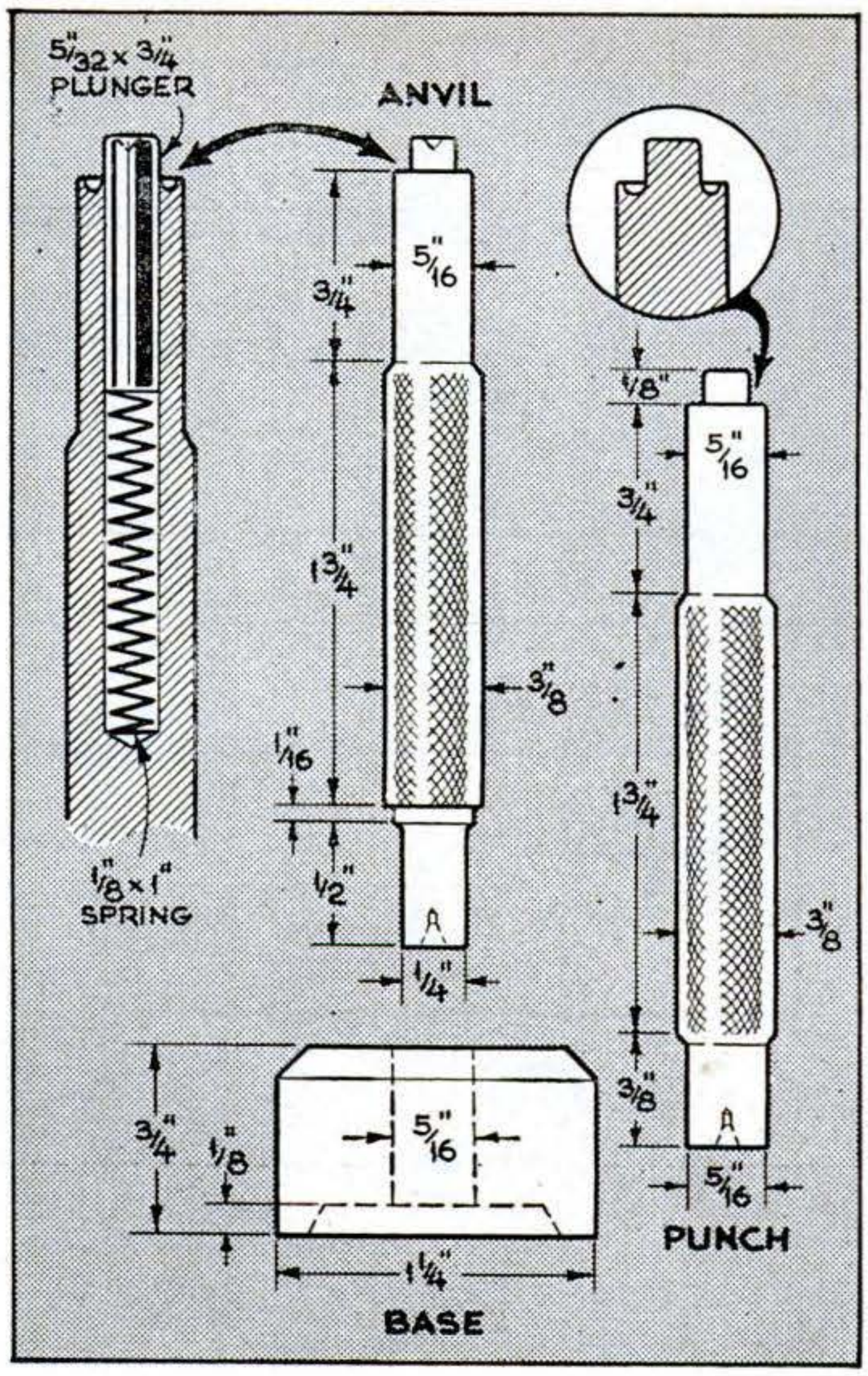
Copyrighted material



Use the base for installing grommets in radio chassis or on work where a vise isn't convenient.



Turn the tips and annular grooves to suit the grommets you buy. The plunger slides in as the punch turns over the edge of the grommet.



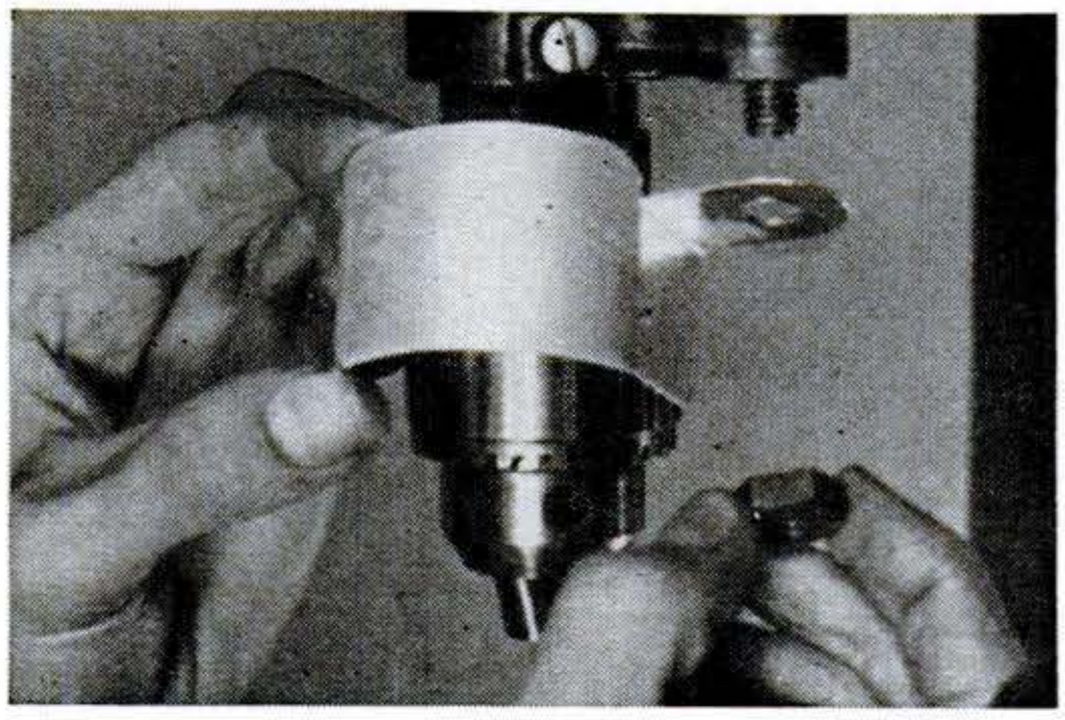
Drill-Rod Tools Install Eyelets

EYELETS or small grommets are very handy in the shop for joining materials together permanently. They are less bulky than nuts and bolts; they join materials too thin or too soft to be tapped; and unlike rivets they leave a smooth-edged hole suitable either for the passage of wires or for hanging the object up on a finishing nail.

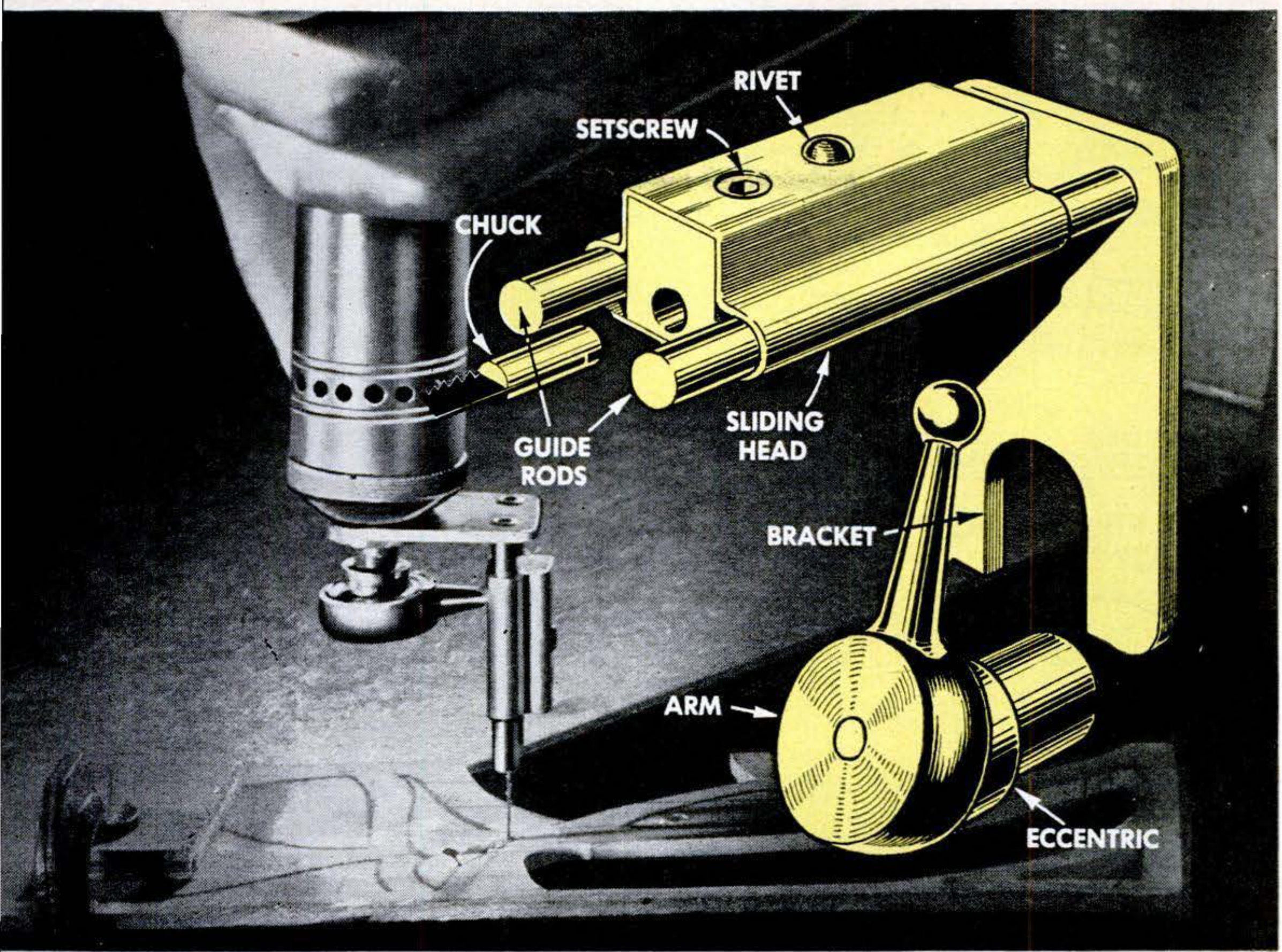
Turn the tools from drill rod to the dimensions shown in the drawing, or else obtain a supply of eyelets and proportion your tools to suit. Hardening and tempering to a blue color is desirable, though if the tools are to be used infrequently they can be left soft. File flats on the shank of the anvil so it can be held in a vise. You can retain the plunger either by turning a wide, shallow groove or filing a flat in it, and driving a pin into the body to project inside but clear the recessed portion.—JOSEPH F. GRECE.

Guard Prevents Drill Press from Slinging Oil

ON MANY drill presses oil from the bearings runs down inside the quill, collects on the spindle or upper face of the chuck, and is thrown off by centrifugal force when the press is operated at high speed. Aside from annoying the operator, it sometimes stains wood being worked. The simple guard shown in the photo, made of fairly heavy-gauge aluminum or brass, will stop this annoyance. A convenient way of mounting it is under the nut at the bottom of the depth stop.—HENRY HANSCOM.



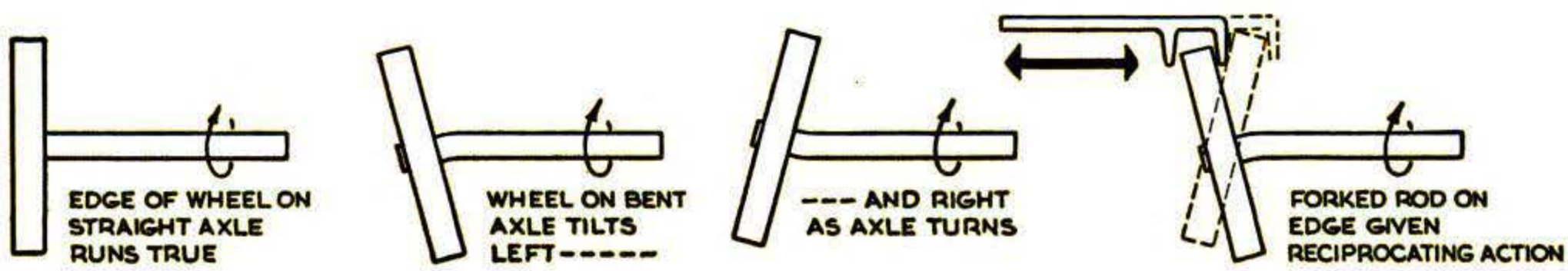
Copyrighted material



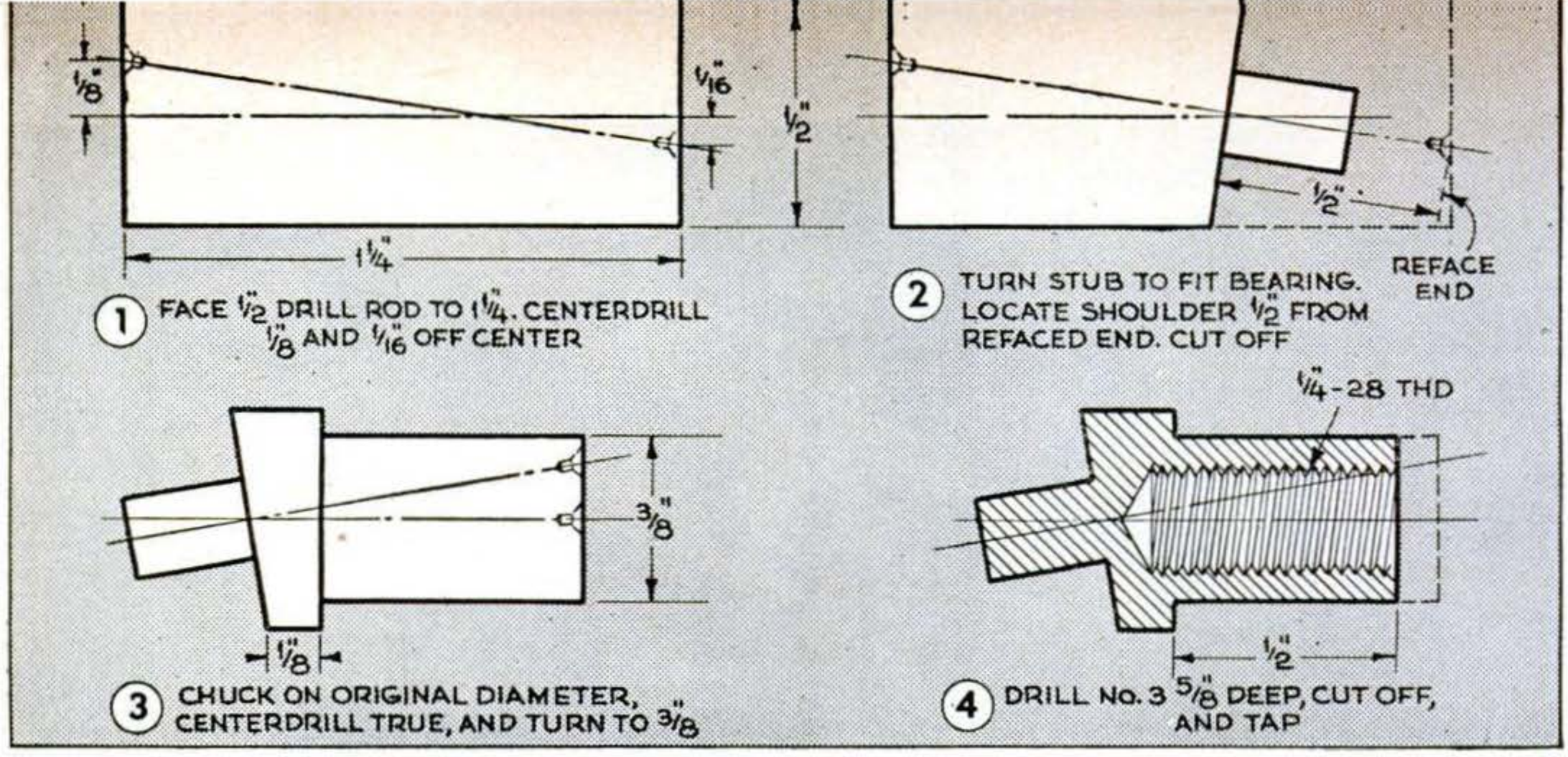
"Wobbler" Converts Grinder to Jigsaw

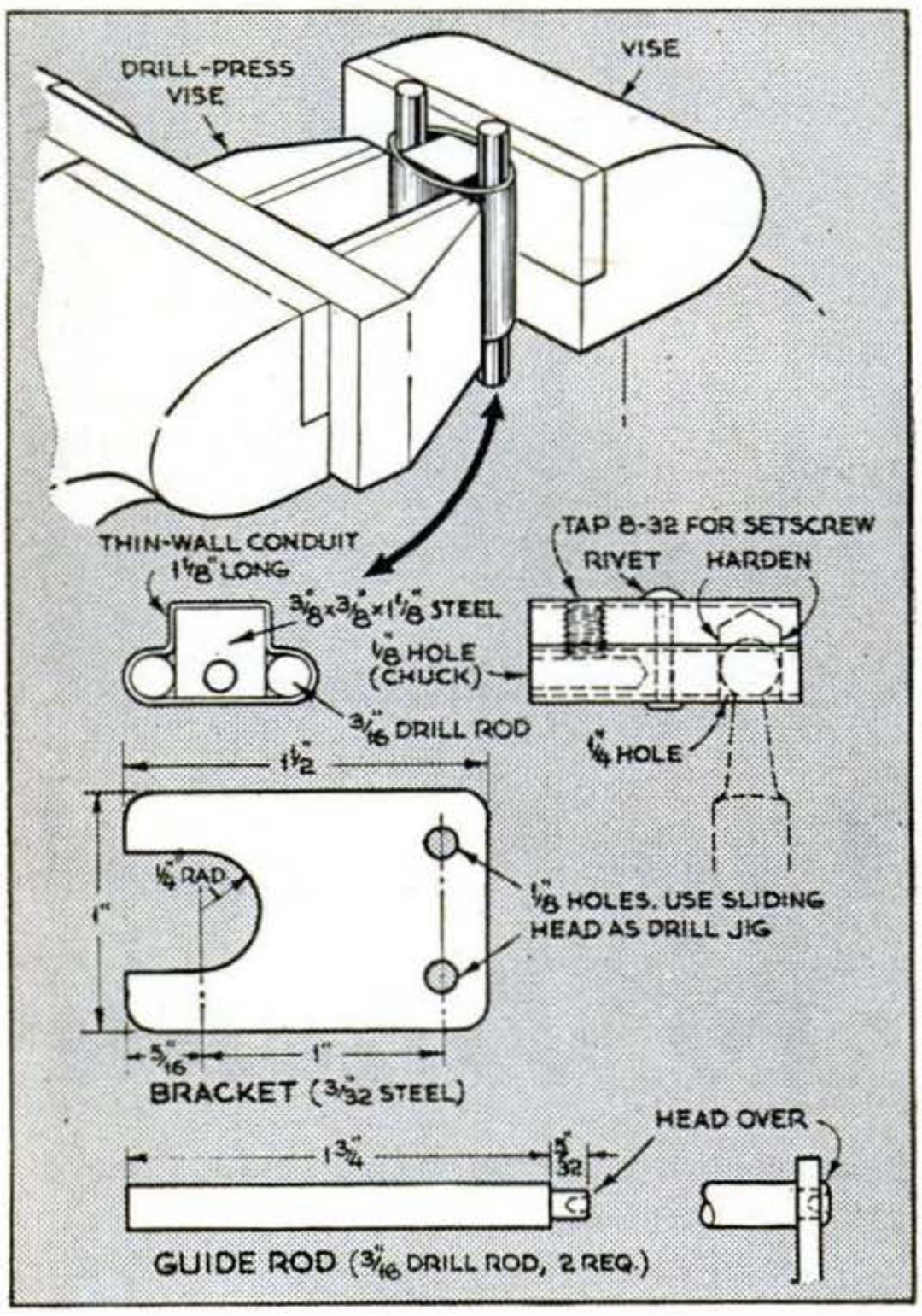
HIGH-SPEED hand grinders or hand motor tools, having won a place in most well-equipped shops, can be given still greater usefulness with this attachment, which converts rotary to reciprocating motion. It will take a jigsaw blade, needle file, abrasive stone, or engraving point. As a saw it will deliver about 10,000 cuts per minute, and since it has no frame, it works well as a keyhole saw. As a file or grinder it performs nicely in close quarters, dressing small fillets or forming notches or slots. The engraving point marks almost anything—glass, hardened steel, even turning bits. With a tiny rasp or chisel in the chuck the tool is fine for woodcarving; with a felt-pad attachment it polishes metal or plastic jewelry.

The operating principle, shown diagrammatically below, is that of a wabble or swash plate, a fairly uncommon mechanical movement sometimes used in high-pressure pumps. Just as a bent axle or cocked wheel

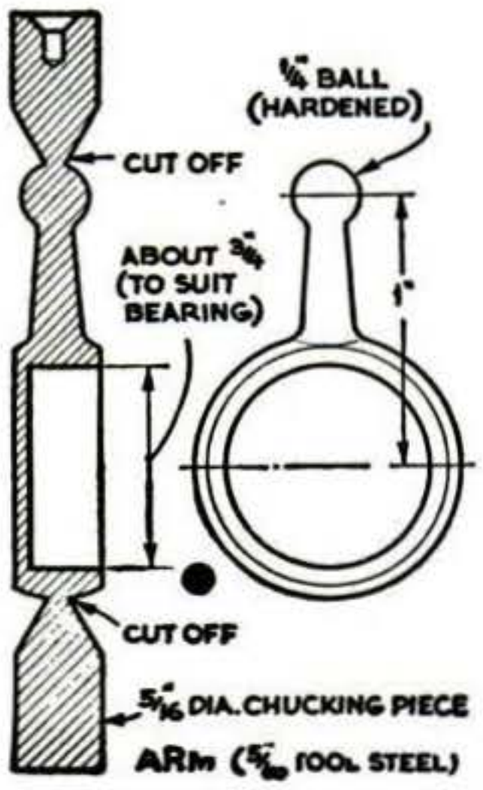


Copyrighted material

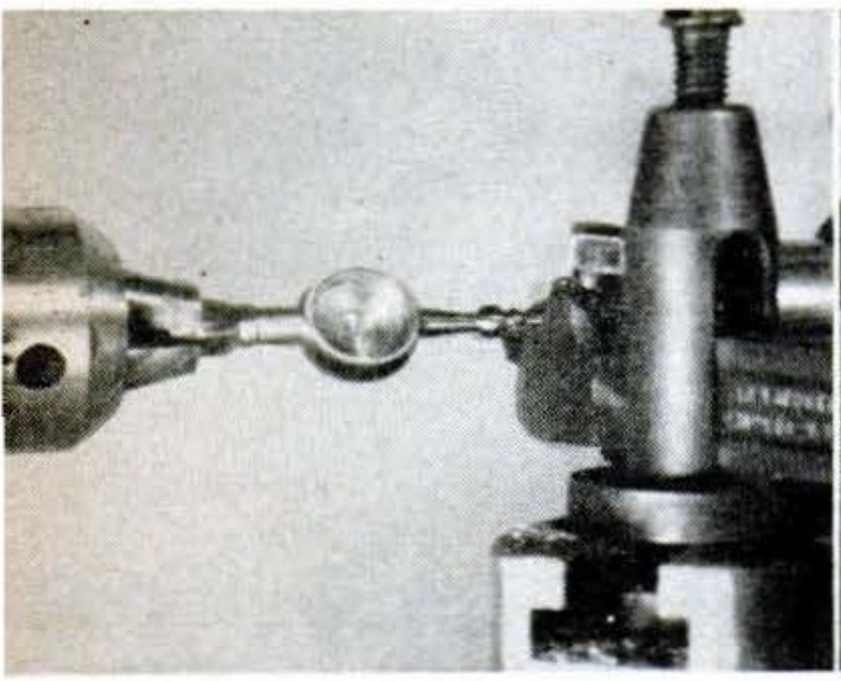


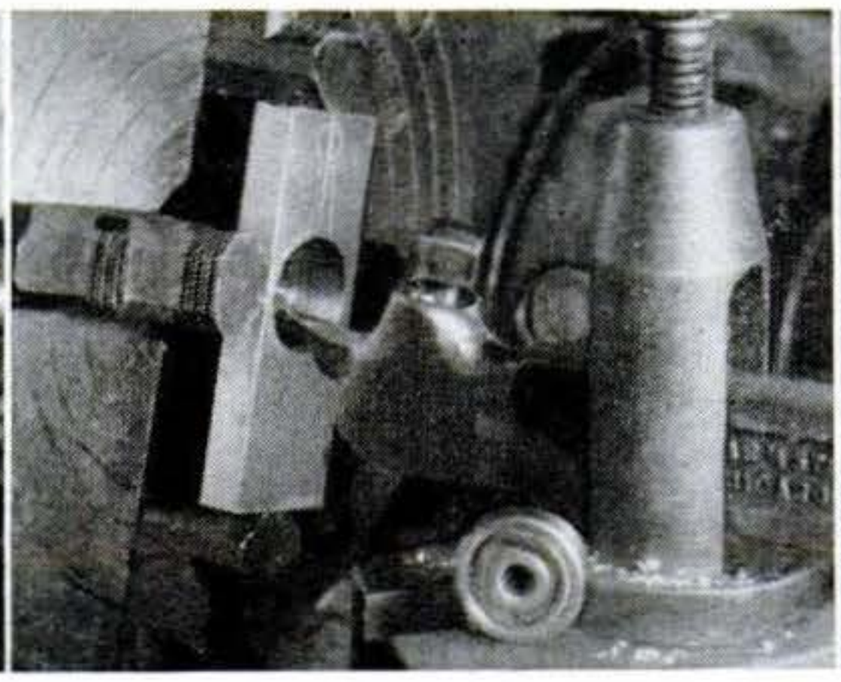


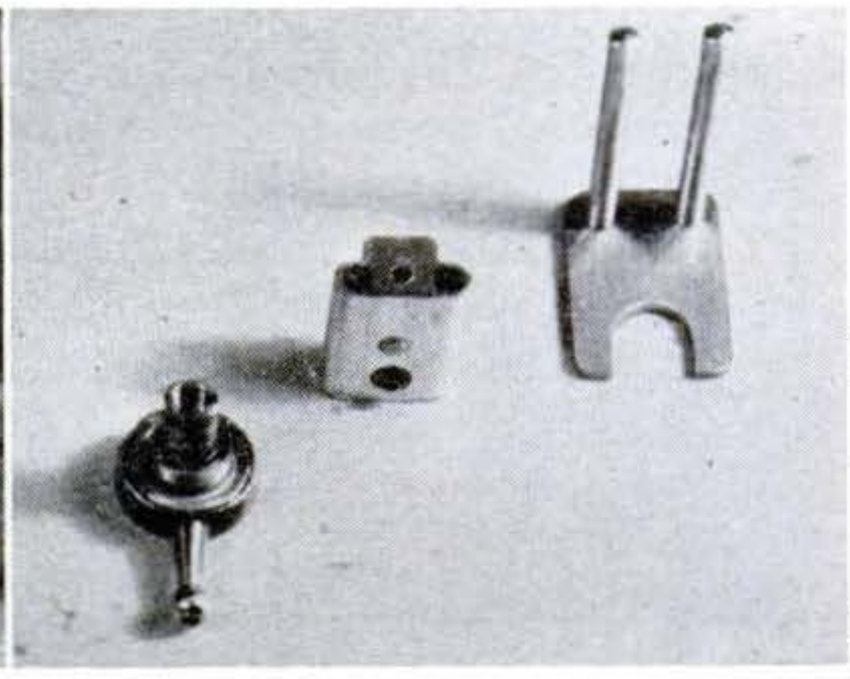
will wobble in turning, the wobble plate will produce reciprocating motion in forks or followers that ride on it. In this attachment a short arbor threaded on the motor shaft has a stub end that deviates by about 11 deg. from the arbor axis. On this stub fits a small ball bearing. An arm around its outer race has a hardened ball at the end, and this goes in a hole in a crosshead sliding between two guides. The arm transmits a rapid in-and-out motion to the block, the stroke being about 3/16" long. A hole in this block with a setscrew entering it holds the saw, file, or other tool.



Make the eccentric arbor first, following the steps suggested at the top of this page. After being faced and centerdrilled, the work is mounted between centers with the 1/16"-off end at the tailstock and turned a







Turning the ball on the arm, left, after it's been bored out to take the ball bearing, as in the center. Note the bearing on the tool rest. The complete unit before assembly is at right.

Copyrighted material

light press fit for the ball bearing. I used a shielded New Departure bearing No. 7035. The shoulder should be ½″ from the end after the latter has been refaced just enough to permit measurement. Reversed in the lathe (and recentered true if you wish to use tailstock support), the work is held in a 3-jaw chuck or ½″ collet, turned to ⅜″, drilled, cut off, and tapped to suit the threads on the motor-tool shaft.

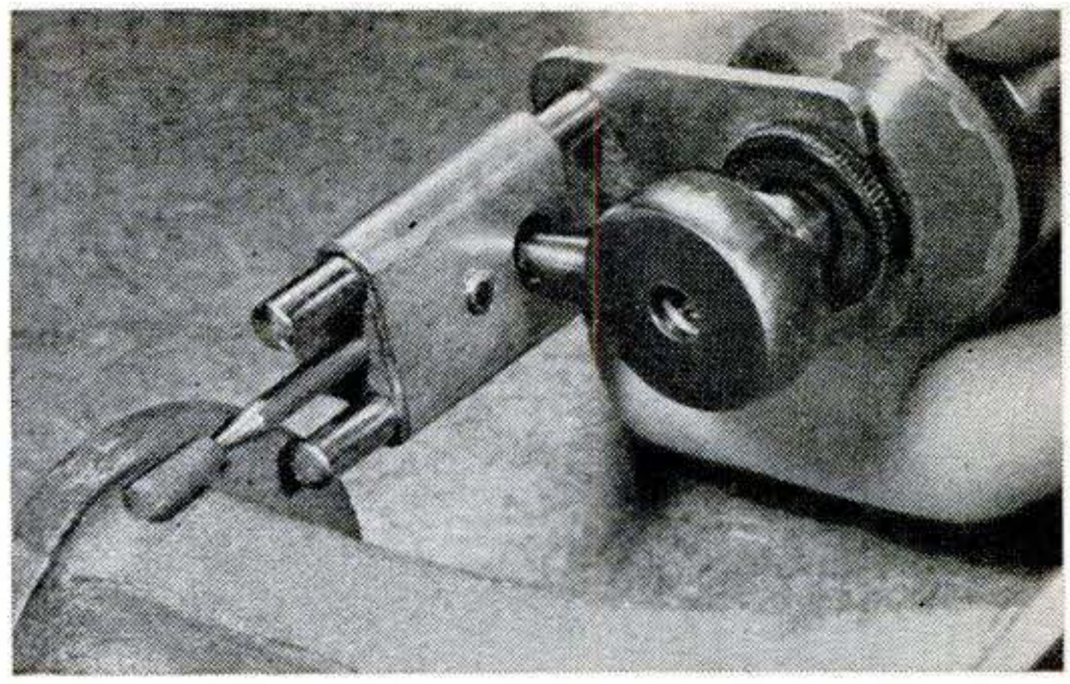
If you modify the dimensions of this part, keep the amount of wobble fairly small or the tool will vibrate excessively. Also, keep the bearing-locating shoulder at or near the intersection of the two axes on this arbor, or the ball at the end of the arm will slide in its hole like a piston.

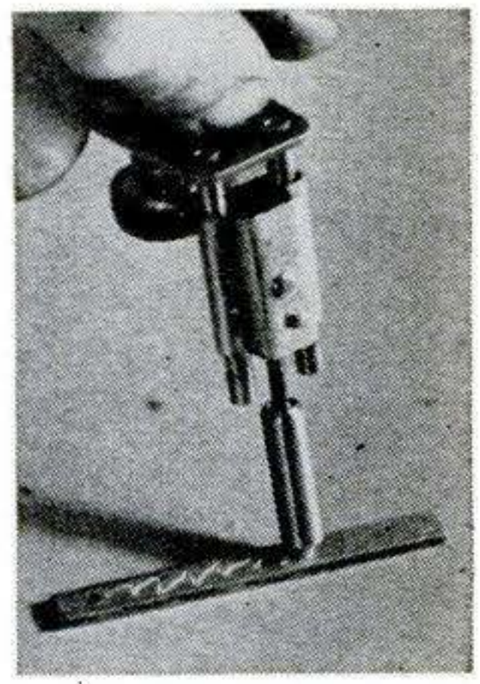
Lay out the arm on a piece of 5/16″ high-carbon steel plate, mount in the 4-jaw chuck, and bore out a light press fit for the outside of the bearing. Centerdrill the ends, cut away some of the excess metal with a hacksaw, and turn to shape. The ball, which may be roughed out with a cutting tool and then finished off in the lathe with a file and emery cloth, should be held as closely as possible to a uniform ¼″ diameter. After cutting off the stub ends and cleaning up the piece with emery, harden the ball and temper to a light straw color.

The crosshead consists of a length of thin-wall conduit squeezed around a little billet of square steel. Shape it with two vises as shown, setting the jaws of the drill-press vise ½″ apart. Drill the setscrew, rivet, chuck, and ball holes, press out the block for hardening and tempering, and then reassemble and rivet together. (Don't forget to tap for the setscrew before hardening.)

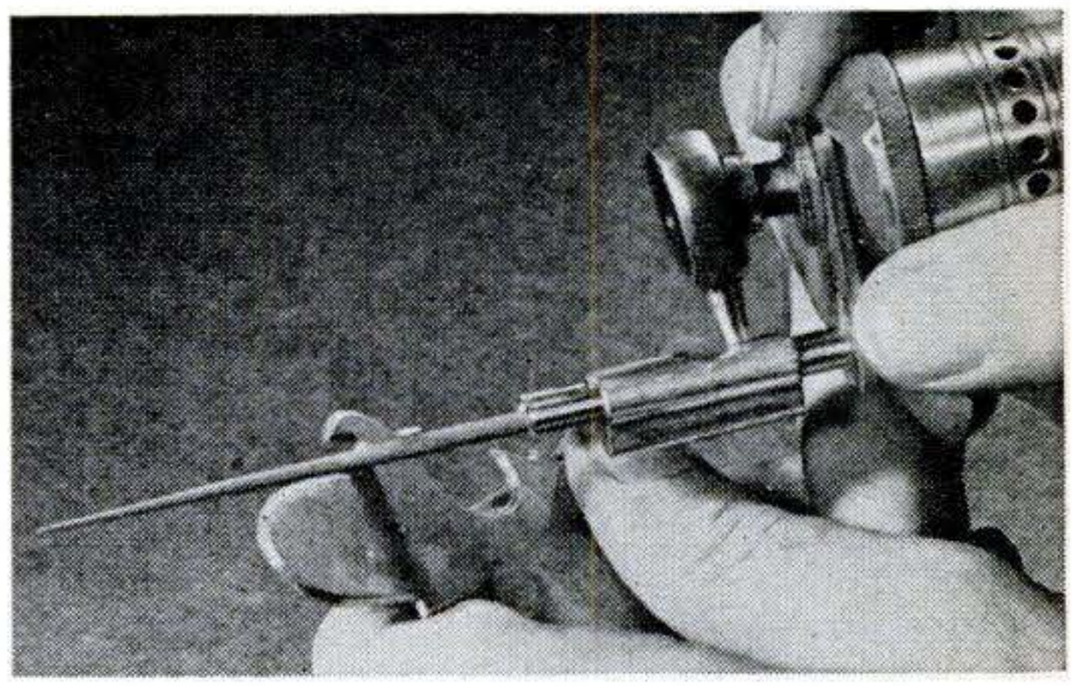
Saw out the mounting bracket, adapting it as necessary to suit your hand grinder. Drill a hole for one of the guide rods, which are lengths of 3/16″ drill rod shouldered at one end, and then use the crosshead itself as a drill jig to spot the hole for the other guide rod. Assemble the bearing on its eccentric arbor, retaining it if the fit is too easy with a few light punch marks around the edge of the stub. Press the arm over the bearing, holding it in place if necessary in the same way.

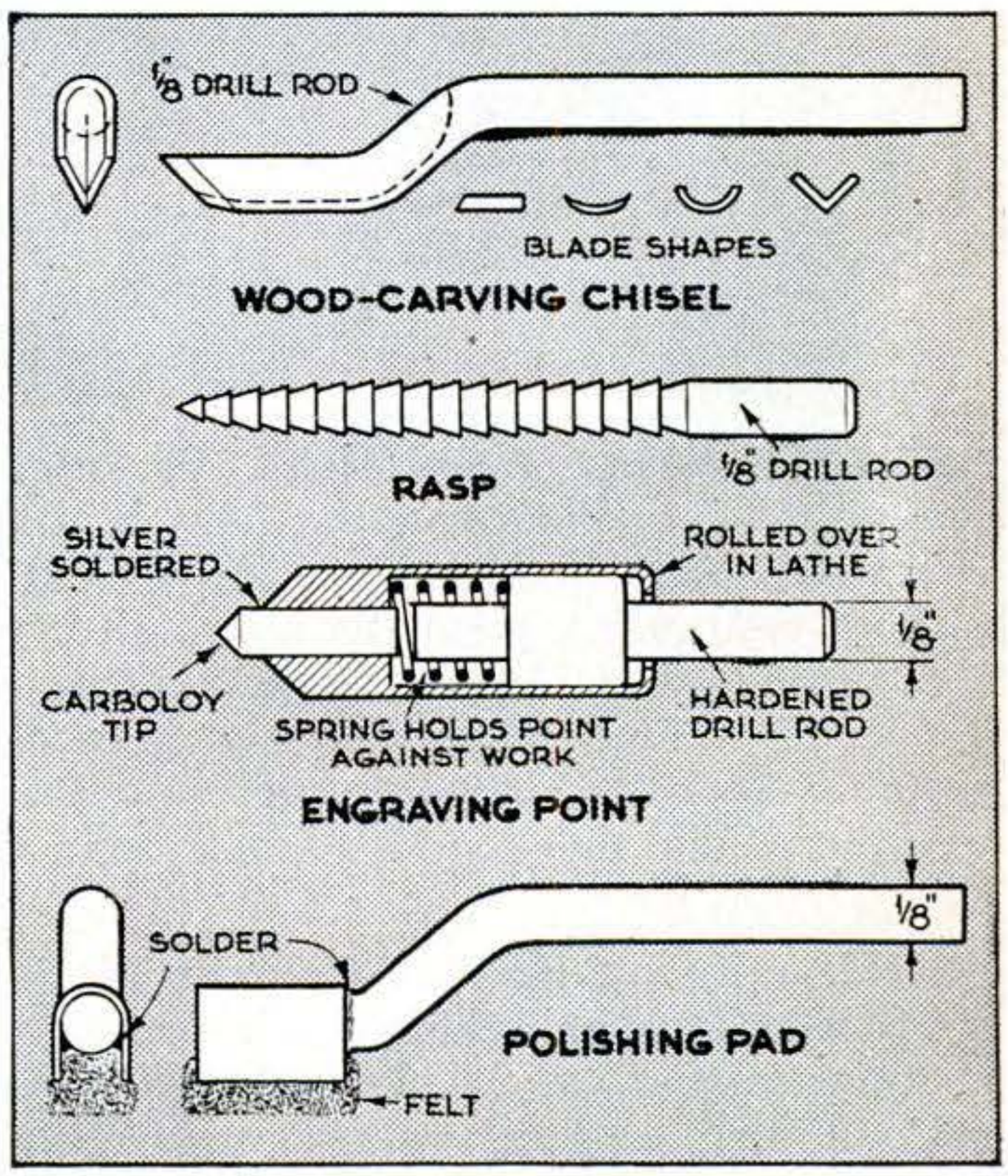
Some of the many tools suited for use in this attachment are suggested at the right. Ordinary jigsaw blades, knives, and other flat-shanked tools may be chucked with a slotted piece of ⅛″ rod. Saw blades work best if they are mounted to cut on the "pull" stroke.—ALFRED J. BROSSEAU.





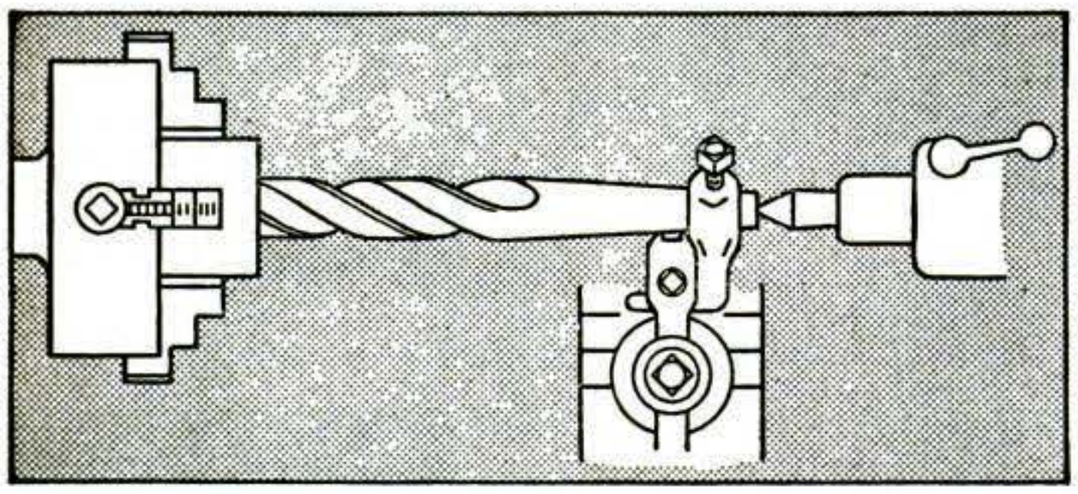
Countless uses in the shop will be found for the reciprocating attachment. Above a round stone is employed to dress a fillet on a casting. At right, an engraving point writes on hardened steel, and below a needle file touches up a metal plate. The drawing suggests different kinds of special tools that can be made up for use in the attachment.



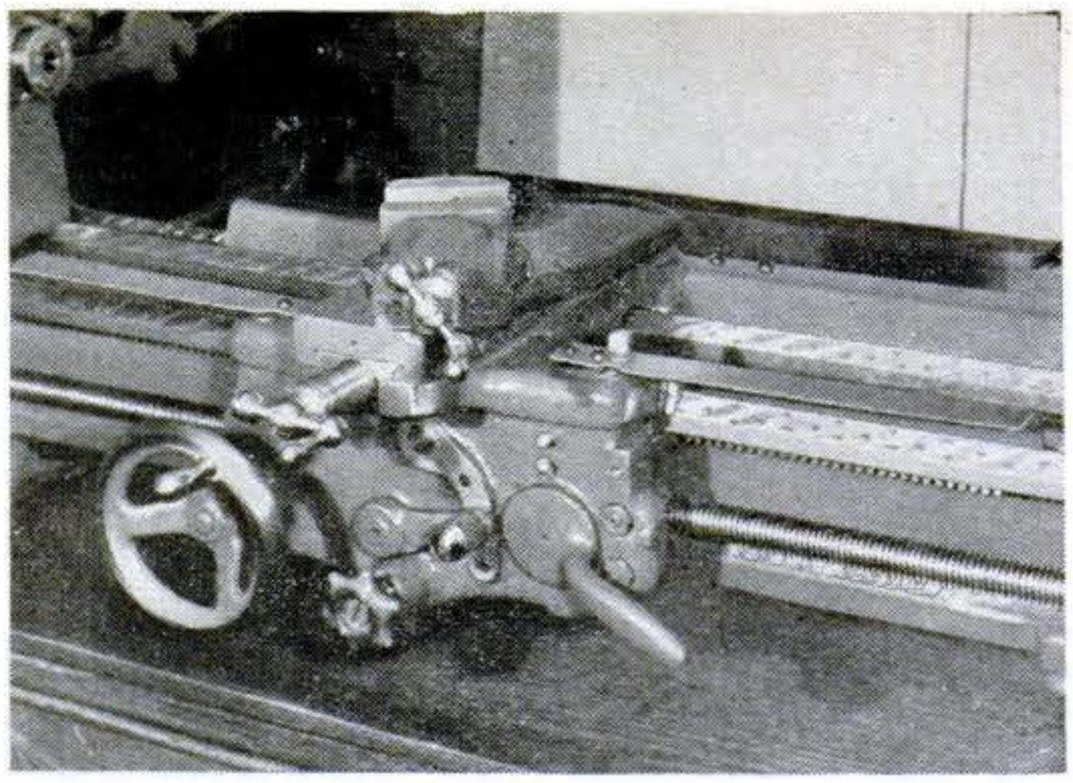


Copyrighted material

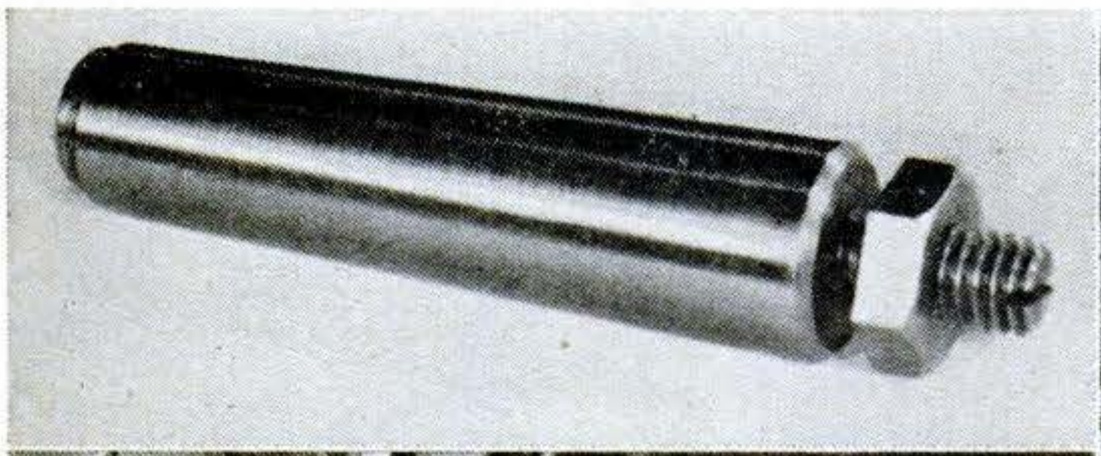
NEW SHOP IDEAS

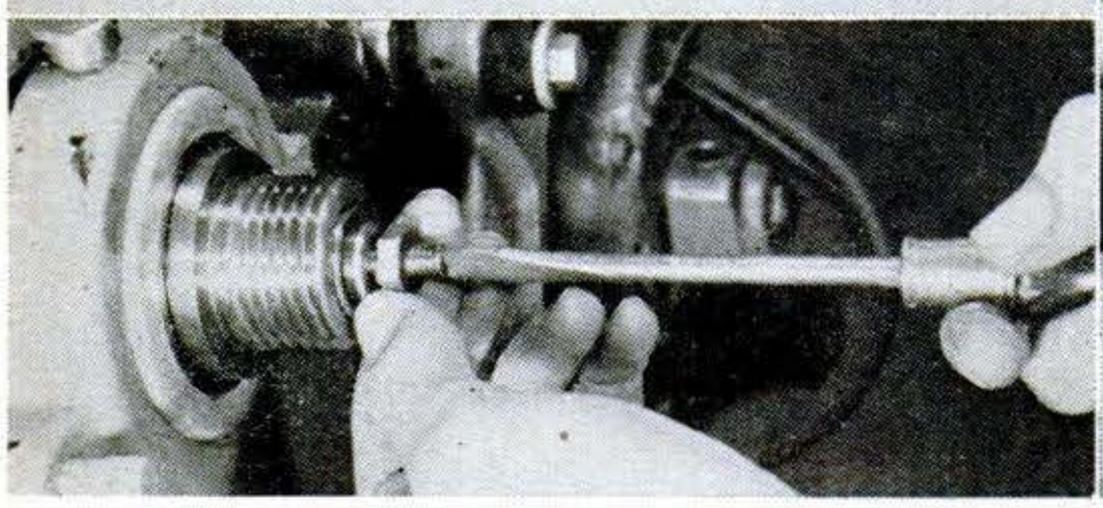


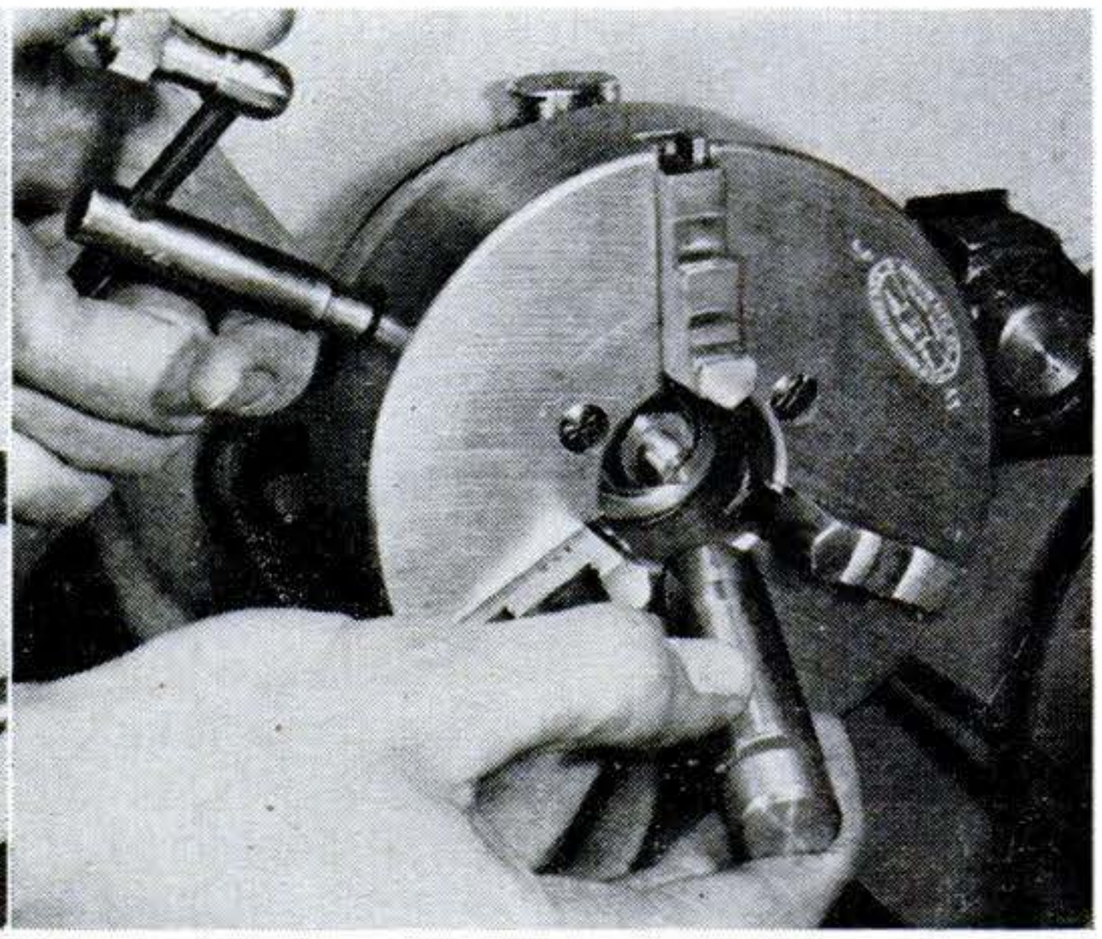
Using Big Drills. A straight or taper-shank drill that is too large for the tailstock chuck or tailstock itself may be used with the method shown above. A lathe dog resting on the cross slide will take the drilling torque. Spot-drill the work to insure an accurate start, use a slow speed, and feed with the tailstock ram. If you are making a through hole, apply back pressure against the dog with the tool holder and carriage when the drill is about to break through at the far end.



Guard Your Ways. Dropping a chuck or other heavy object on the carriage ways of a lathe will be much less harmful if they are protected by these sheet-metal shields. Four of them are bolted to the sides of the carriage with 8-32 machine screws. They are made of 1/16″ by 2″ by 9″ sheet metal, formed to the inner contours of the carriage ways. The rear left guard is slightly shorter than the others so as to clear the gear-guard bracket, and a clearance hole is drilled for the carriage lock.—B. J. Corey.



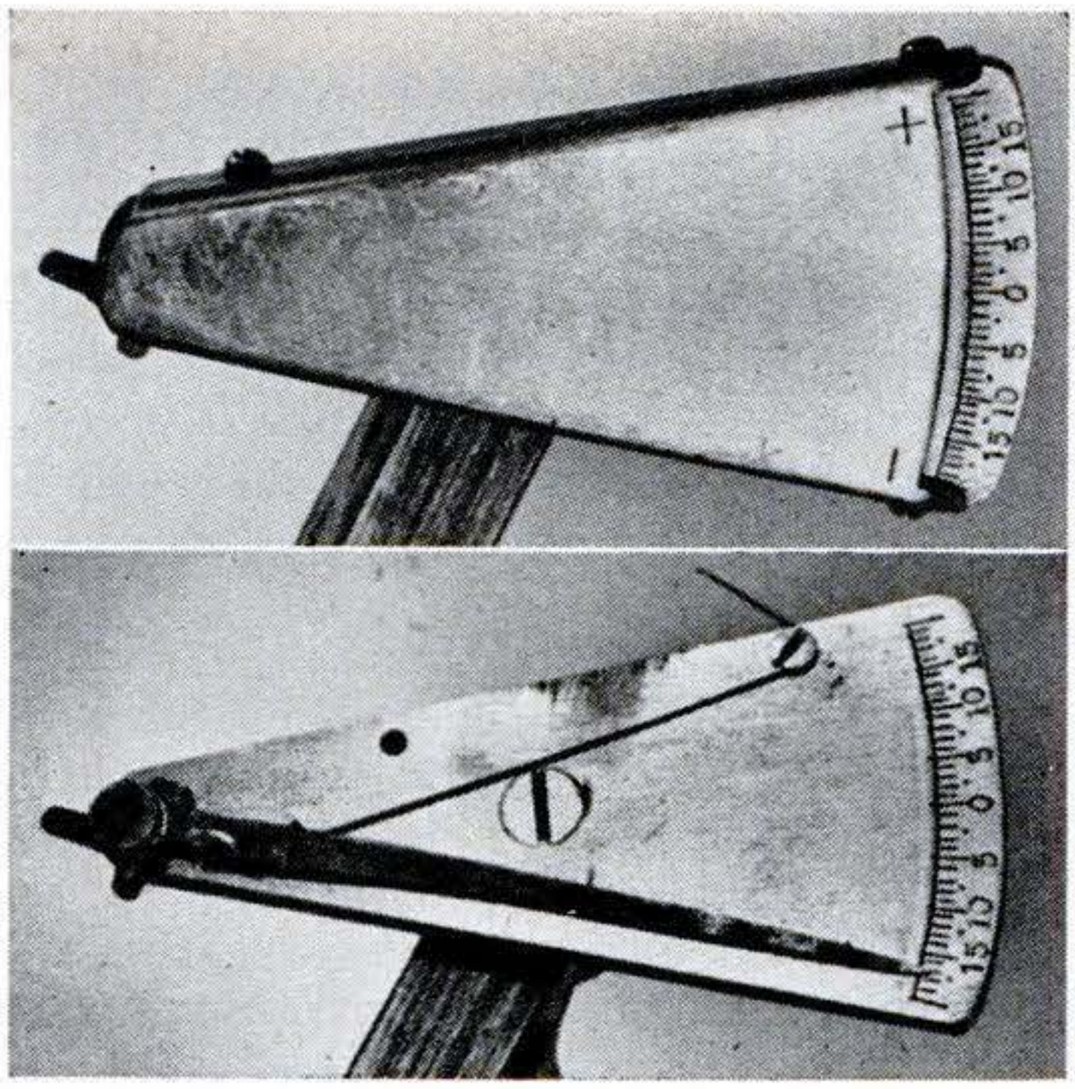


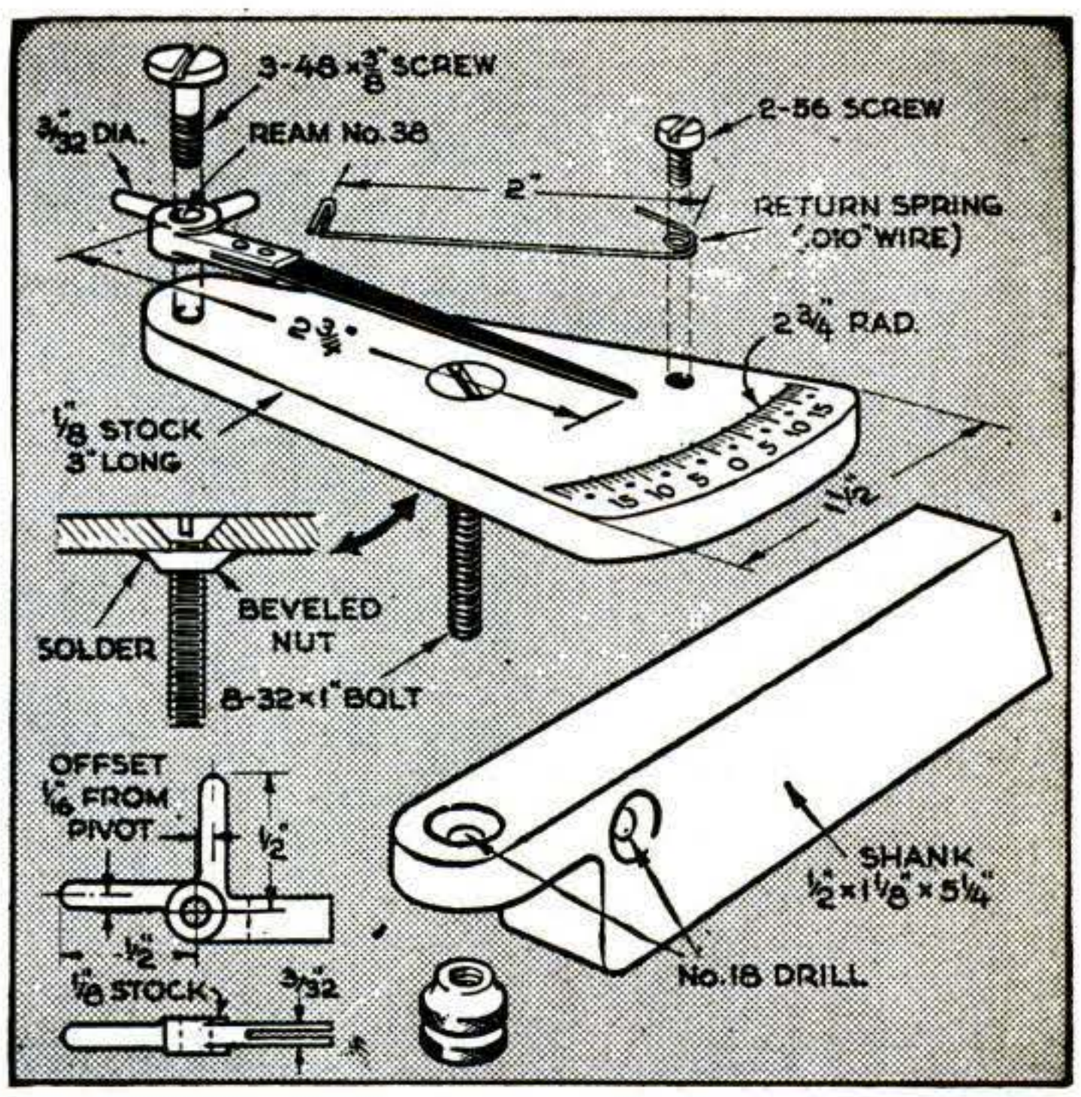


Spindle Stop Positions Work. Round stock smaller than the hole in the chuck often slips back under heavy drilling, turning, or knurling, no matter how hard the chuck is tightened. An adjustable stop inside the spindle prevents this and also permits accurate repeat positioning of duplicate workpieces. The one above was made from a scored tailstock center softened by heating red-hot and allowing it to cool slowly. (A live center needs no annealing). Push it into the spindle and face it off until only ⅛″ projects. Drill and tap for a setscrew, and provide a thin lock nut. Besides acting as a stop, the plug keeps chips out of the spindle taper.—Richard Hanscom.

Milling Long Slots. A narrow saw is apt to wander when milling a long slot, with resulting inaccuracy. To overcome the tendency of such saws to "walk," take a fairly shallow first cut—.030″ to .040″. The saw will not run off during this shallow cut, which guides it for the following heavier ones.—Harold B. Eastman.

Copyrighted material



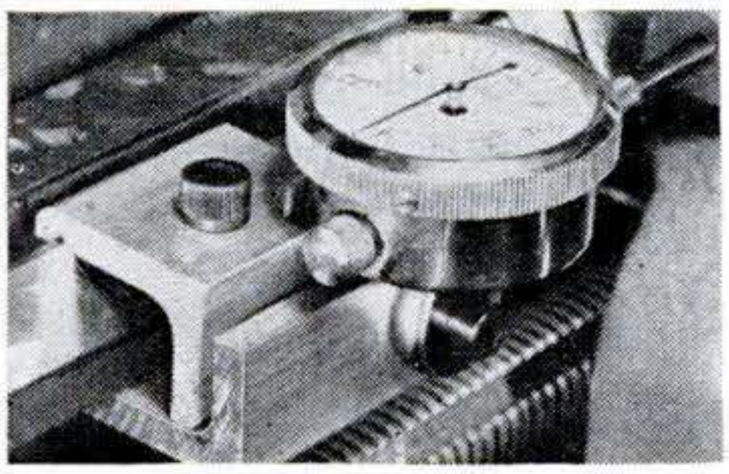


Sensitive Shopmade Indicator Reads Thousandths

REQUIRING no gears or critical machining, this indicator has a range of over .015" plus or minus and can be set up two ways.

Shape the base plate of 1/8" cold-rolled steel, clamp the mounting bolt to it with a beveled nut, and secure with solder. Use hardenable steel for the pivot lever, laying out the offsets carefully; these are the centerlines of the ball tips, which should be smooth and polished. Ream the hole a close fit on the pin. Harden all over; then draw to straw color. Solder a bit of jeweler's saw blade in the slot as a pointer.

The spring makes a single loop about its anchor screw, and has a short end that bears against the case. Use a lock nut beneath so the screw doesn't clamp the loop. A cover can be bent from sheet metal. It might be held by prick-punching four spots into dimples in the plate instead of with screws as in the original. The shank is of soft steel, with two mounting holes for the indicator. Set it up to bear against work along the offset line, so that this 1/16" offset is the short side of the multiplying lever. With the cross-feed collar of the lathe, index and lightly punch the graduations. Scratch them as lines radiating from the pivot.—JOHN A. BLAKER.

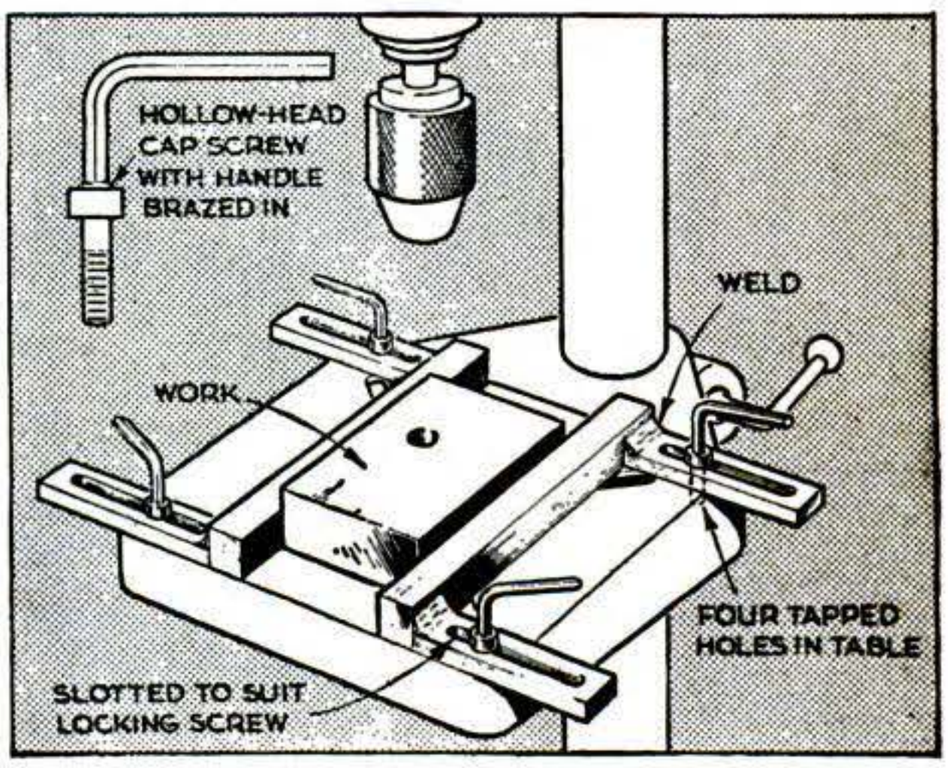


Indicator Mikes Lathe Carriage Travel

BY CLAMPING a dial indicator on the lathe bed you can gauge tool travel accurately for precision turning and boring. Made of aluminum angle, the clamp won't scratch the ways. Mill or file a groove in the top angle for the V-way and drill it to clear a cap screw. Tap the lower one for this and a second screw to mount the indicator.

Clamps Lock Work on Drill Press

QUICKLY set clamps that both position work and keep it from twisting make drilling safer and more accurate. These clamps consist of bar stock to which slotted members are brazed or welded. The slots should be long enough to permit the bars to touch in their innermost position so as to hold the smallest work likely to be handled. Locking bolts consist of hollow-head cap screws into which wrenches are brazed to form handles. Use washers on the bolts as needed so that the handles clamp tightly when turned out.—E. L. JOHNSON.



Copyrighted material

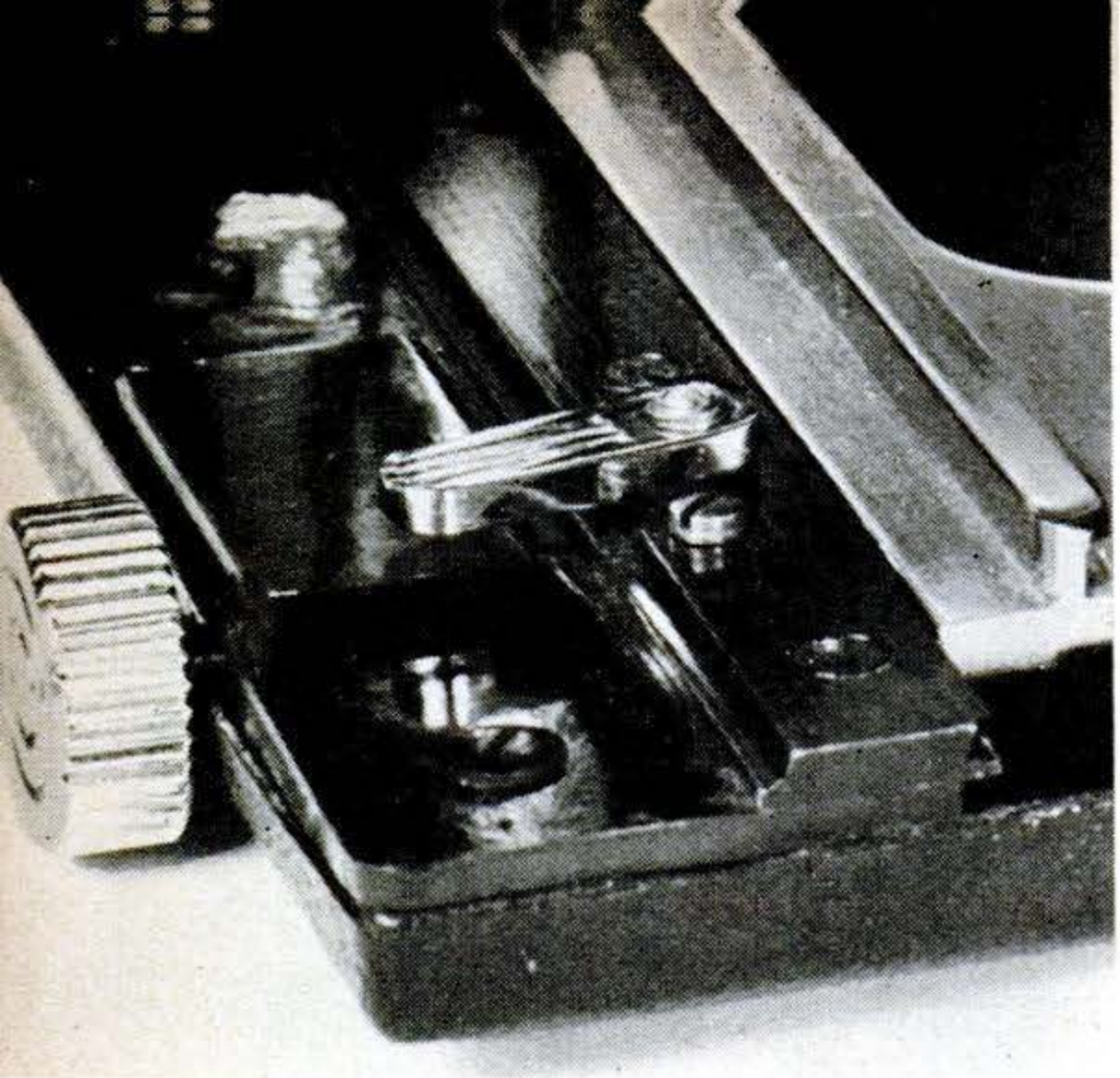
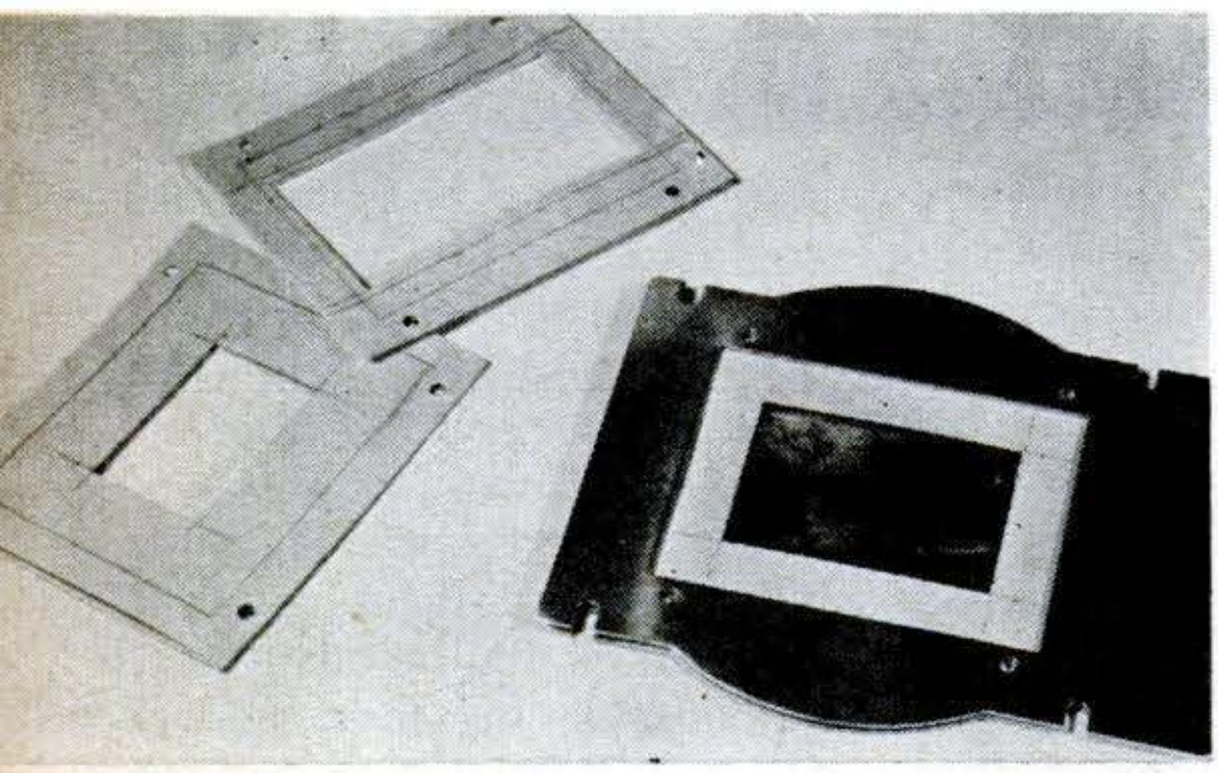
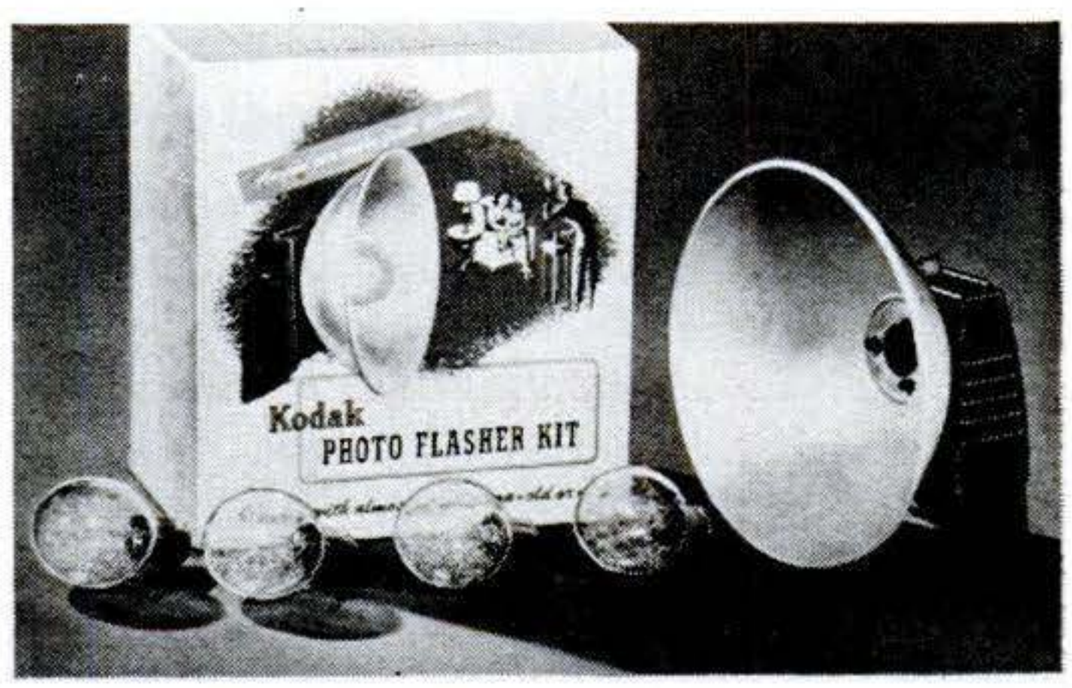


PHOTO IDEAS AND EQUIPMENT

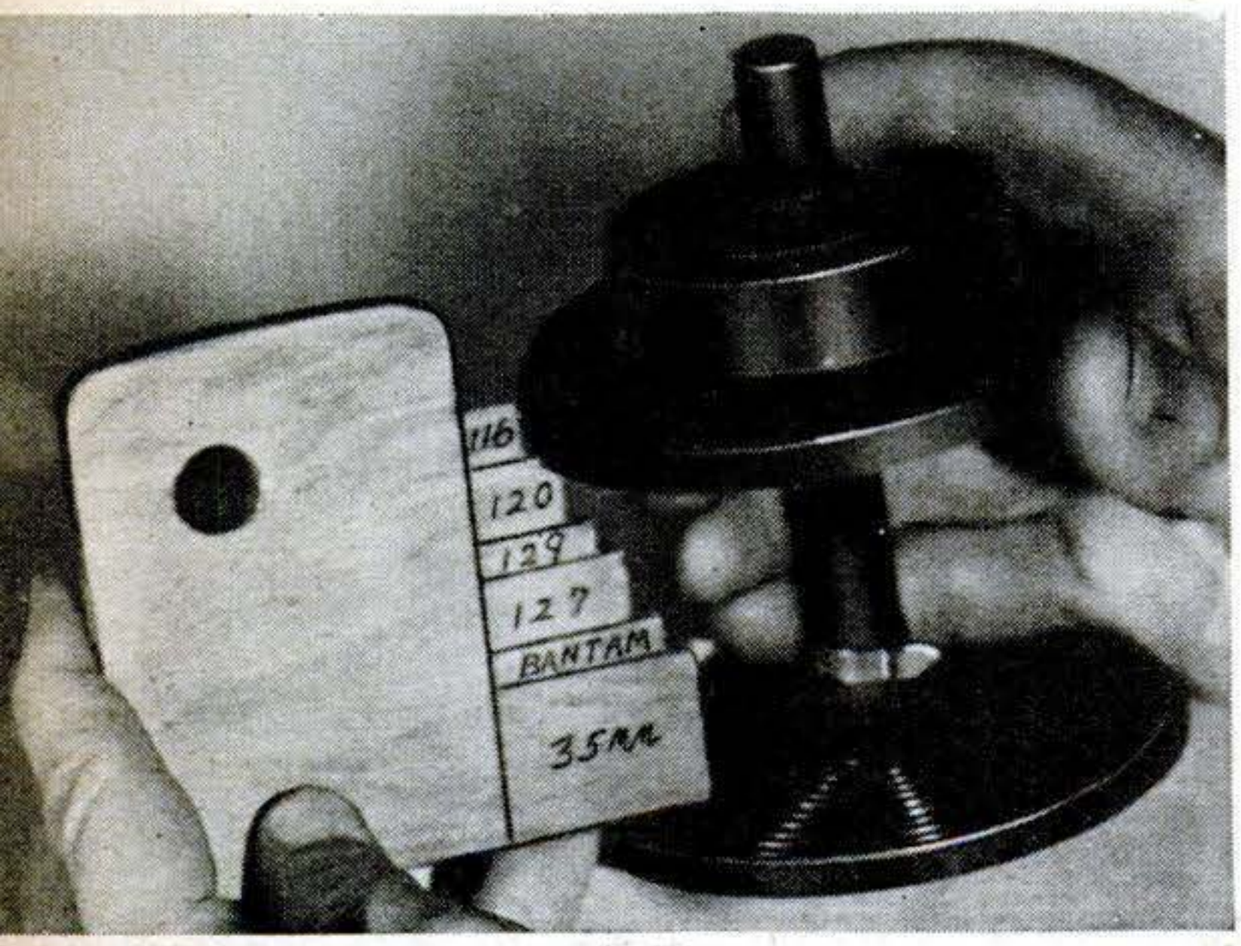
Screw Limits Track Lock. A 2-56 fillister-head machine screw set in the bed of this Speed Graphic limits the forward swing of the track-lock lever and gives finger-tip control. This is especially convenient when a lens of long focal length is used and the lens-board standard partially covers the lever. The screw hole was made with a No. 50 drill and then tapped. In locating the hole center, allowance should be made for the radius of the screw head and the necessary travel of the lever.



Carriers Cut from Folders. An auxiliary carrier to suit a negative smaller than your regular enlarger carrier will accommodate may be cut from an ordinary file folder. Those above were made by placing a folder in the metal carrier and tapping on the pins to "die-cut" the alignment holes. Openings were cut with a knife and ruler.



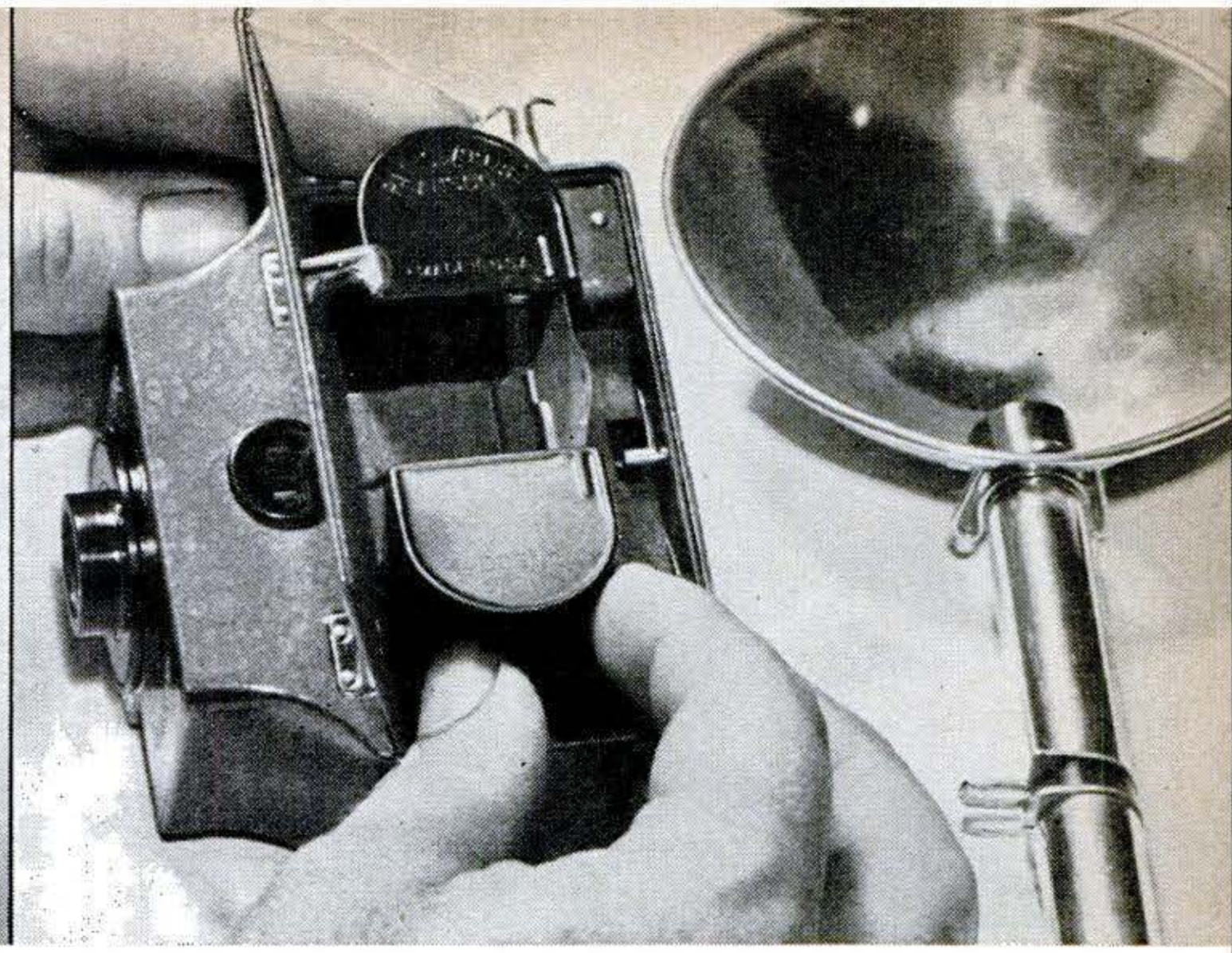
Open-Flash Unit Announced. A new unit designed for open-flash photography is offered by the Eastman Kodak Company. Priced at about $1.25, it consists of an aluminum reflector attached to a compact battery case that also serves as a handle. An ejector button makes it unnecessary to handle hot flash bulbs once the picture has been taken. The flasher requires one C-size flashlight cell and uses either No. 5 or SM bulbs.



Guide Locates Film Size. If you frequently process roll film of different sizes in your developing tank, a wood guide with stepped notches to suit each film width that the reel accommodates will provide a quick and sure means of adjusting the flange for any desired film.

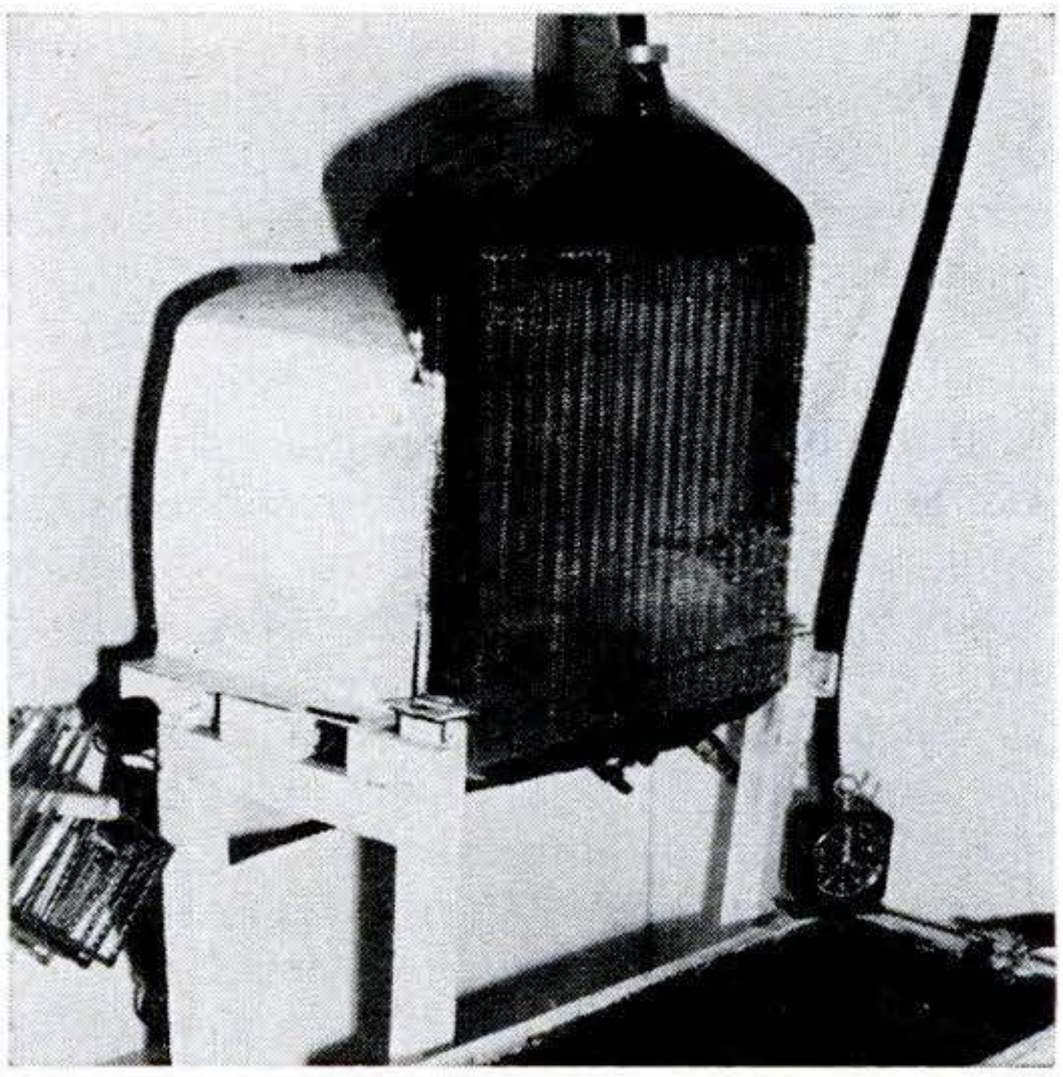
First, make a cardboard template of the guide by adjusting the reel flange through its full range of stops. Then transfer the outline to ¼" plywood, cut with a coping saw, sand the edges smooth, label each step according to the film size it governs, and apply a coat of clear shellac. A hole bored in the handle will enable you to hang it up with other accessories.

Copyrighted material



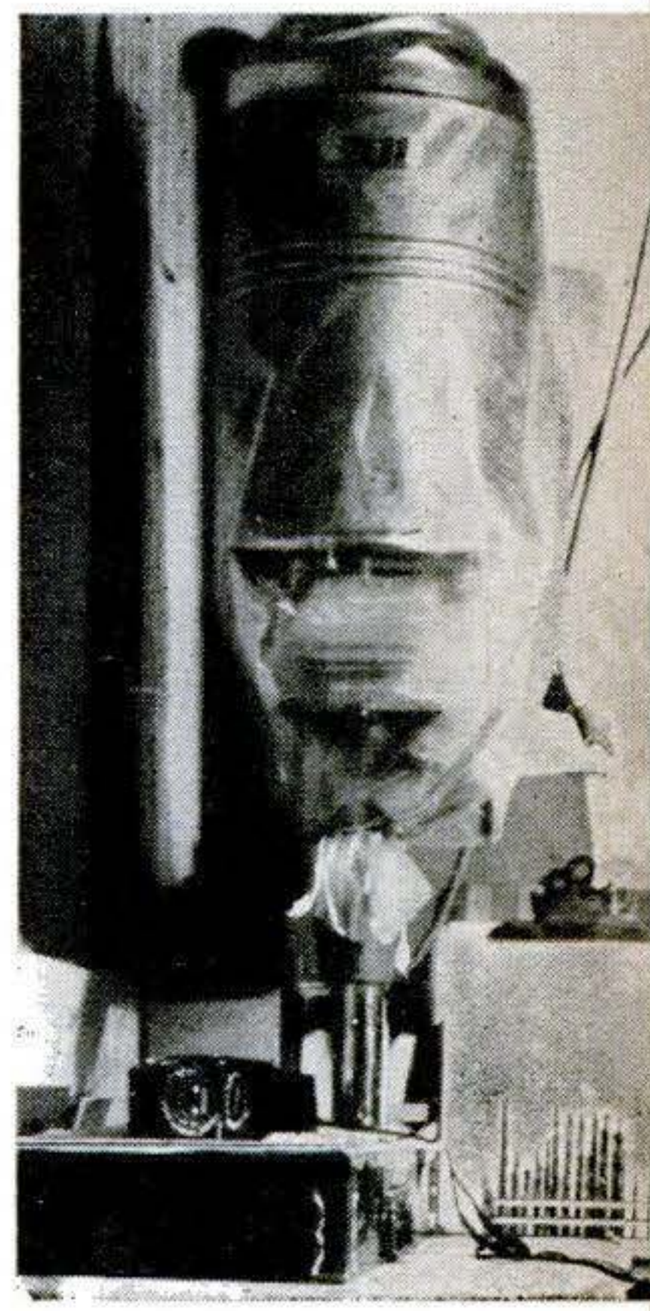
New Camera Introduced. A compact fixed-focus camera with a shutter speed of 1/50 sec. and only one adjustment—a diaphragm having three different apertures—has been developed by Raymond R. LaRose, of Culver City, Calif., designer of the Whittaker Micro 16 (PS, Dec. '46, p. 188). Using 35 mm. film, the new camera has a color-corrected lens, a double-lens viewfinder, and built-in flash synchronization. The same plunger that snaps the shutter also moves the film into position for the next picture, making it possible to take many shots in quick succession.

Called the "Rapitake," the camera was designed to use Ansco Memo film.



Cool or Heat Your Darkroom. An old car radiator that doesn't leak, an electric fan, and a few feet of garden hose will produce excellent results in cooling your darkroom in summer and warming it in winter. Extend one piece of hose from the top of the radiator to the nearest water faucet, and run another from the bottom to the sink. Then place the fan so it will blow air through the radiator. To cool the darkroom, run cold water through the system. To warm it, use hot water.—Fred Dierksmeier.

EnlargerCover. A large sheet cut from a damaged plastic shower curtain provides excellent material for an enlarger cover. Drape the material over the enlarger, pin to conform to the shape, and then sew or staple. Turn the resulting cover inside out to hide the stitches, and place a drawstring around the bottom edge so the envelope may be pulled tightly shut while the enlarger is not being used. Close stitching renders the seam dustproof.—Emil Gaynor.

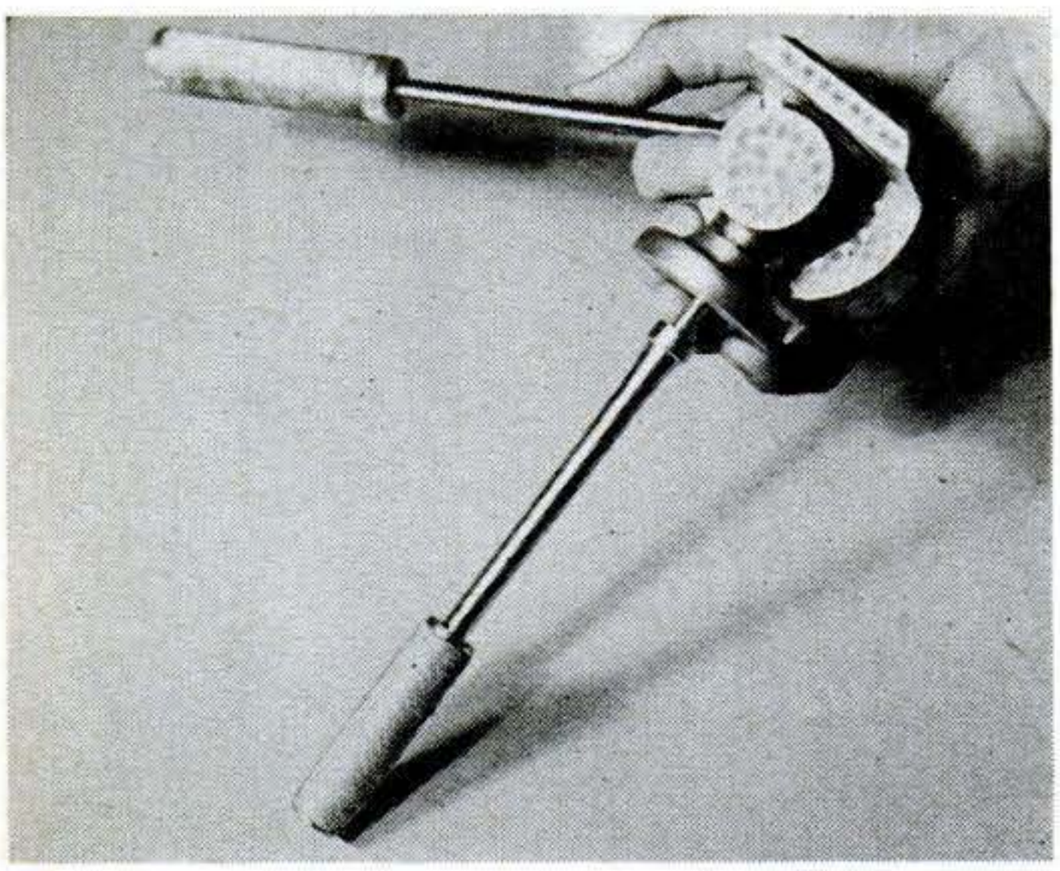


Wetting Agent Avoids Spots. In spite of repeated spongings, water spots sometimes mar an otherwise good negative. These often are the result of extremely hard water, a mineral deposit being left when the water dries. Such spots can be prevented by rinsing the negative briefly in a 1 percent solution of a wetting agent.

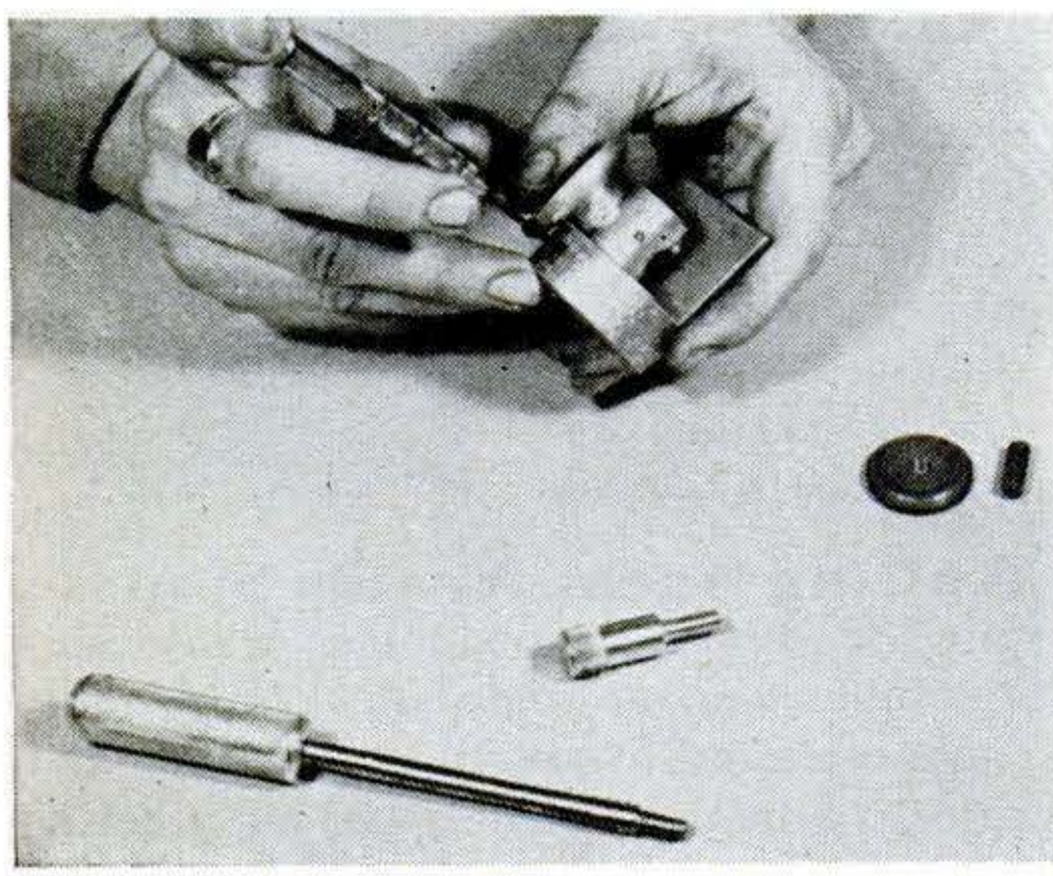
Copyrighted material

One Turn Locks Pan-Tilt Head

By M. C. Anderson



The heavy-duty head will accommodate cameras of any size. Note it has a long tripod screw.



Setscrews riding in ⅛" grooves keep the head members from separating even when not locked.

TURNED from aluminum on a small lathe, this tripod head provides both pan and tilt action with one control. It pans through a full 360 deg., tilts 90 deg., and locks securely at any position of pan or tilt by a quarter turn of the handle. Dimensions are given in the table on the facing page for constructing heads of two sizes—one for press and other large cameras and a lighter head for smaller cameras. In either case, the construction is the same.

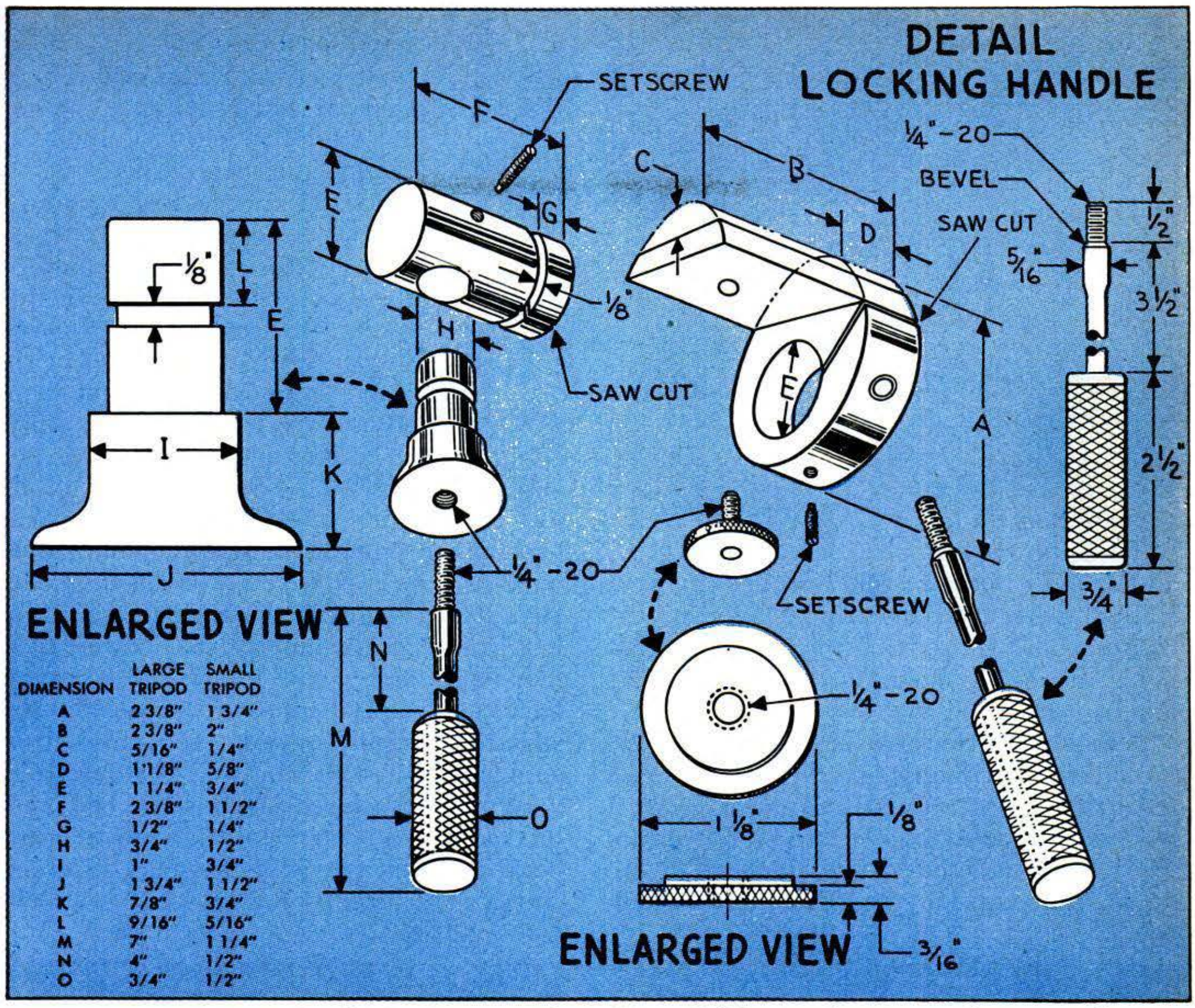
If aluminum stock of sufficient size is not available, you can melt down a quantity of scrap and let it cool in a tin can. Old aluminum cylinder heads, pistons, household pots and pans, and the like may furnish the metal. The scrap can be melted by placing it in a can over a gas plate and then directing a blowtorch against the can to provide the necessary additional heat.

Saw Cuts Provide Locking

Begin by making the large piece that gives the head its tilt action and also serves as the camera mounting pad. Turn it down to diameter *A* and then face off the ends to length *B*. Next, mount the piece off center in the four-jaw chuck and bore the hole for the horizontal bar. Rechuck at 90 deg. to the previous position and face off the side for the camera mounting pad, removing metal as indicated by the dimension *C*.

The piece is now finished by hand. Remove the surplus metal from beneath the camera pad first, using a hacksaw to make the cuts and finishing with a flat file and emery cloth. Then drill a hole clearance size through the camera pad for the ¼"-20 screw that locks the camera to the pad. Also drill and tap a hole at the bottom to suit the setscrew you intend to use, noting that the setscrew should turn in flush and that it has a turned-down end to ride in the ⅛" groove of the horizontal piece. Now drill a radial hole from the rim toward the center; it

Copyrighted material

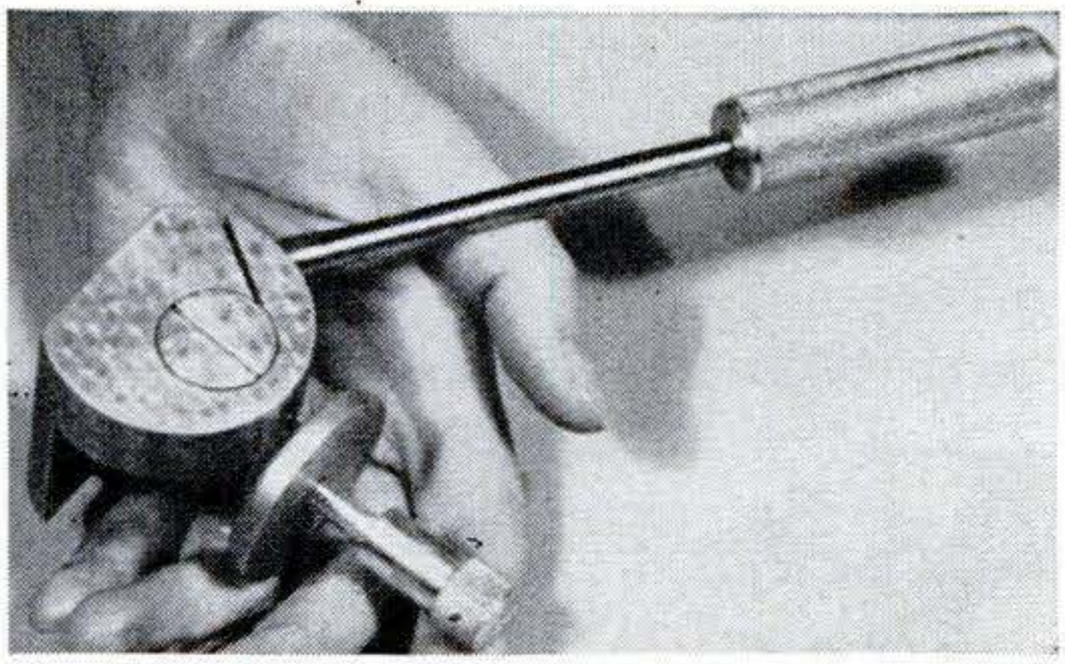


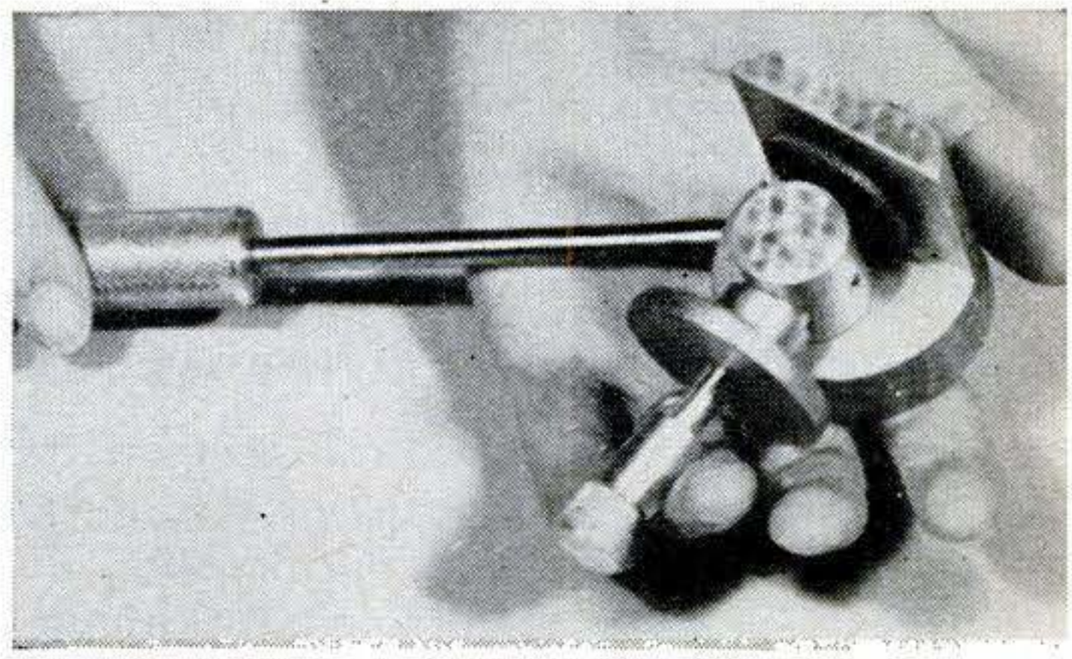
DIMENSION	LARGE TRIPOD	SMALL TRIPOD
A	2 3/8"	1 3/4"
B	2 3/8"	2"
C	5/16"	1/4"
D	1 1/8"	5/8"
E	1 1/4"	3/4"
F	2 3/8"	1 1/2"
G	1/2"	1/4"
H	3/4"	1/2"
I	1"	3/4"
J	1 3/4"	1 1/2"
K	7/8"	3/4"
L	9/16"	5/16"
M	7"	1 1/4"
N	4"	1/2"
O	3/4"	1/2"

Dimensions are given for both a large and small head. The smaller has a short tripod screw.

should be at least ½" deep and tap-drill size for the locking handle. Clamp the piece in the vise (use cardboard or other soft material to avoid marking), and carefully cut through the ring with a hacksaw in a plane about 90 deg. to the locking-handle hole. Counterbore the hole clearance size up to the sawcut and tap the part beyond the cut ¼"-20.

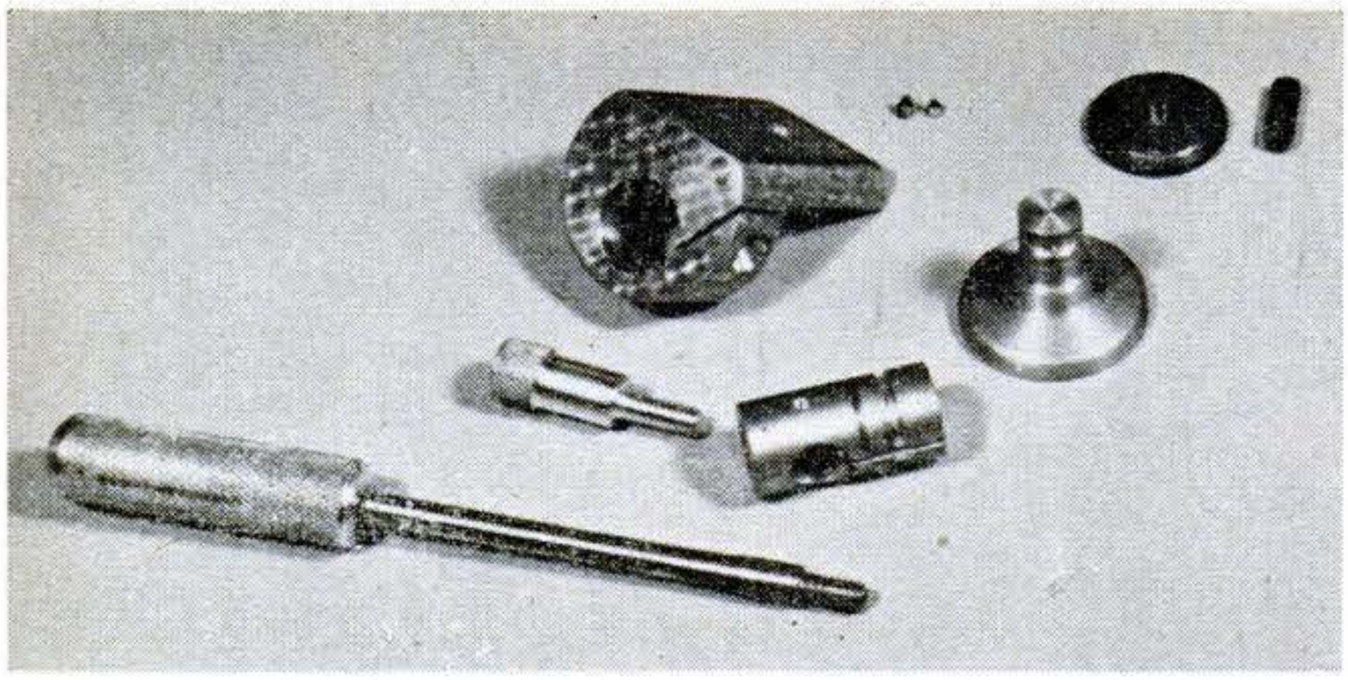
The horizontal bar about which the camera pad tilts is a simple turning and drilling job. Turn it to diameter *E* and length *F*, turn the ⅛" groove, and drill the transverse hole. Drill and tap for a setscrew at right angles to and midway of this hole, and then split the end with a hacksaw up to the large hole. Since the clamping action and rigidity of the finished head depend upon accurate fitting, each part should be carefully checked against its mate. It is best that these mat-





Saw cuts in two parts of the head allow one motion of the control handle to lock both the pan and tilt actions. Opposite faces of the small tripod head are seen in the above photographs.

Copyrighted material



All parts must be a close fit if the head is to work well.

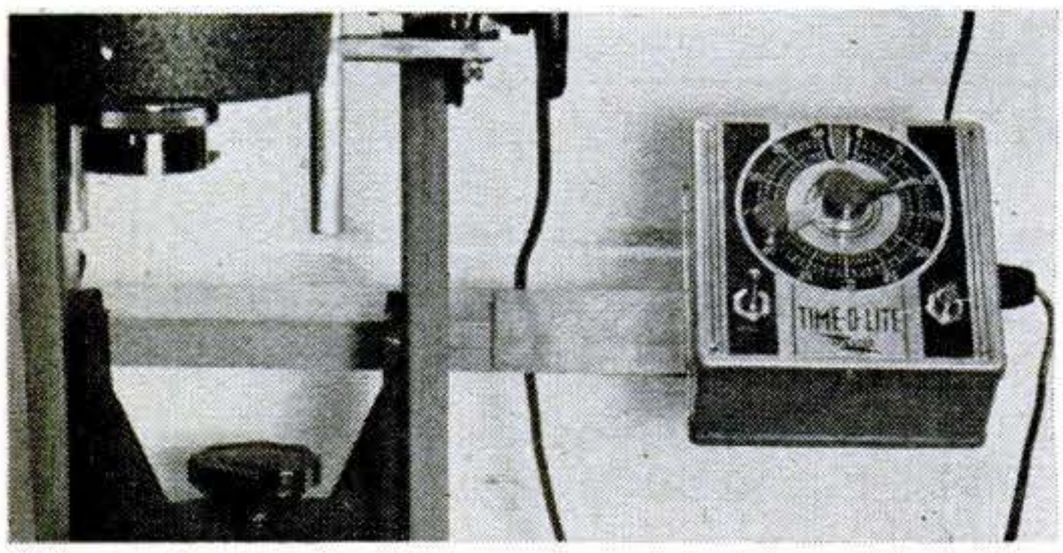
ing parts are a close push fit before the saw cuts are made.

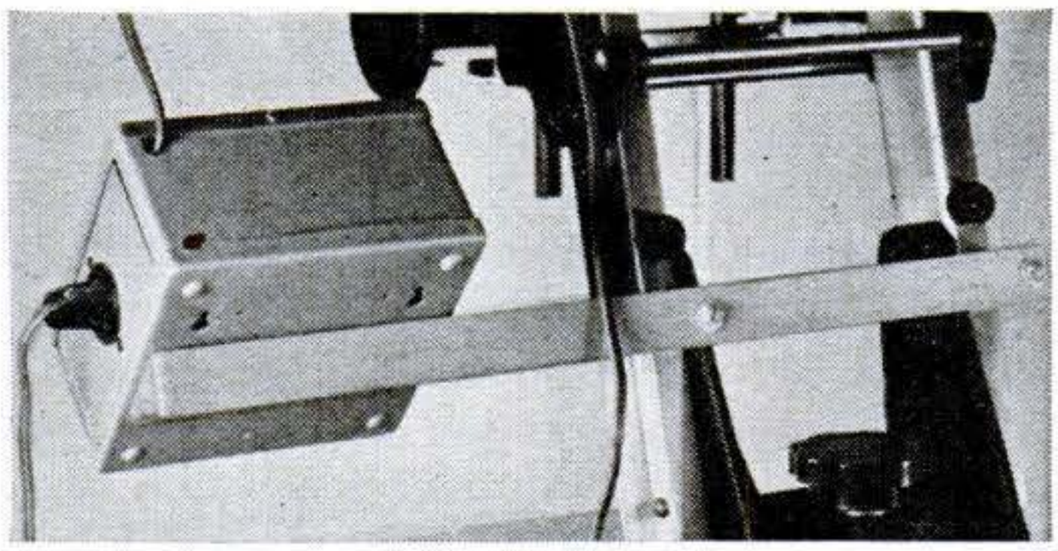
Turn the base to size, face off the ends, and drill the bottom ¼"-20 for the screw that locks the head on the tripod. Notice that this part also is grooved for a setscrew that holds the head together when the locking handle is loosened.

Although the locking-handle grip may be turned from aluminum and then knurled, the rod itself is best turned from steel, since it will receive considerable wear. The entire screw and handle for locking the head on the tripod, however, may be turned from aluminum, for it does not get so much use. You will notice that dimensions *M* and *N* indicate two designs for this bottom screw. Although the long one is easier to reach, it may necessitate removal of the head before the tripod can be closed without marring the legs. A screw of either length might be used for the heavy-duty head. The shoulder at the end of the threads should be square.

A length of ¼"-20 stove bolt may be utilized as the mounting screw. Fit this permanently into the 1⅛" knurled head by brazing, pinning, or simply jamming the threads. The horizontal bar keeps this screw from falling out of the head when not in use.

If you wish, the outer surfaces of the head may be given the whirl patterns of an engine finish. A special rubber-bonded abrasive stick for this purpose may be obtained from a manufacturer of abrasives. However, a very attractive finish also may be produced by chucking a rubber-tipped pencil in a drill press and using it to whirl small pieces of crocus cloth against the faces. END





Timer Mounted on Enlarger Is More Easily Read

VISIBILITY of a timer dial in the darkroom can be improved and its controls can be set more accurately if the timer is mounted on the enlarger as illustrated above.

The bracket was made from a 1" by 1½" by 16" wood strip, 8" of one end being beveled so the timer could be faced upward at about 45 deg. Notches were cut in the front of the bracket to fit it around the enlarger casting, and it was attached to the guide rails by drilling and tapping the latter for 10-32 machine screws. The timer is held to the bracket by two wood screws placed through holes drilled in its back. Another type of enlarger would of course require different treatment—GLENN A. WAGNER.

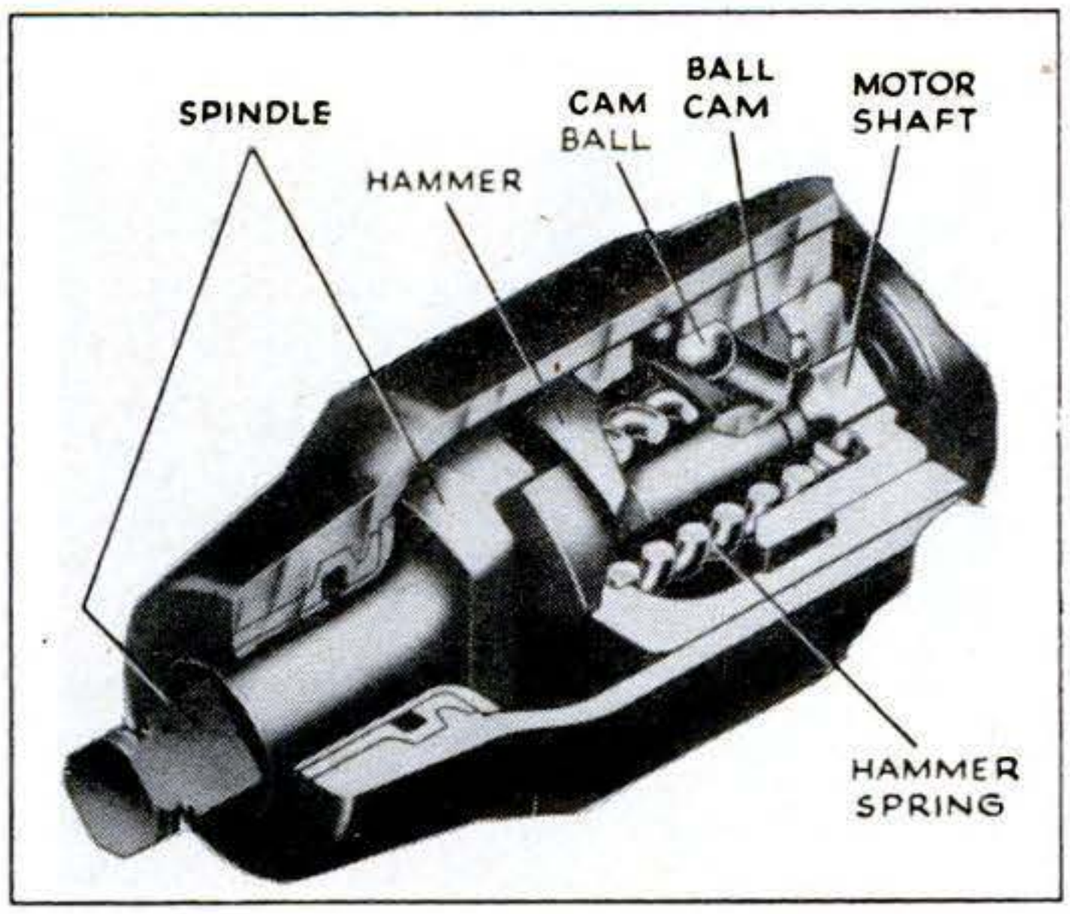
Glossy Prints Ferrotyped on Sheet Cellulose

THIN cellulose acetate sheeting rivals chromium plates as a means of ferrotyping glossy prints. Relatively inexpensive, this clear cellulose may be obtained at stationery stores in 20" by 50" sheets.

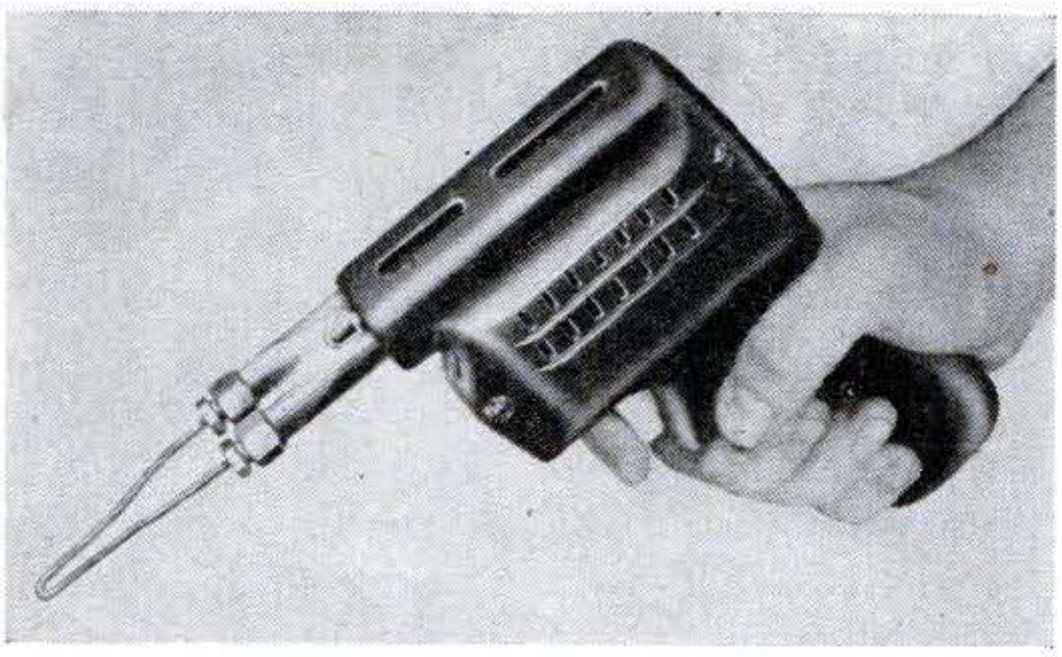
Both sides of the sheeting may be used repeatedly. Ferrotyping is done in the usual manner, but intense heat should not be applied for rapid drying. Because of its lightness and small bulk, a roll of the sheeting is a handy accessory for a traveling photographer.—JACK WILSON.

Copyrighted material

NEW TOOLS

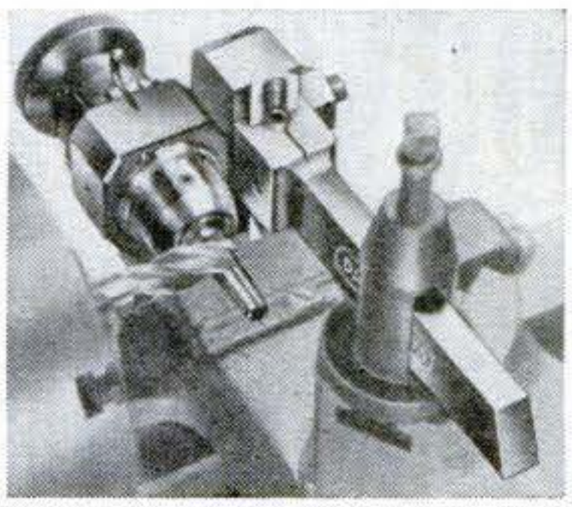


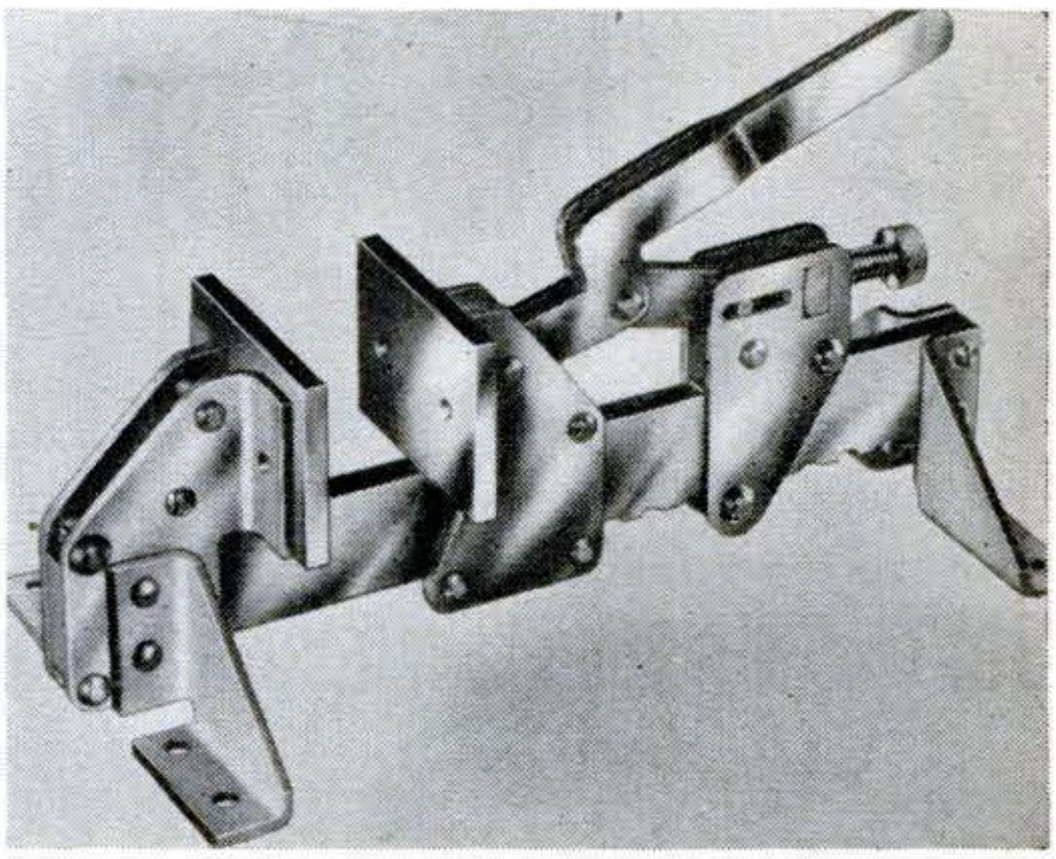
Impact Tool. Until resistance to rotation reaches a certain point, a tool made by Ingersoll-Rand Co., Phillipsburg, N. J., runs like an electric drill. Once resistance on the anvil (or spindle) is greater than spring pressure, the anvil remains stationary while a rotating ball cam pulls the hammer back, compressing the spring. As the cam balls reach the lower part of their track, the hammer delivers a rotary impact on the spindle, 1,900 times a minute. The tool can be used to drive nuts, tap, ream, and drill masonry. Various attachments are offered.



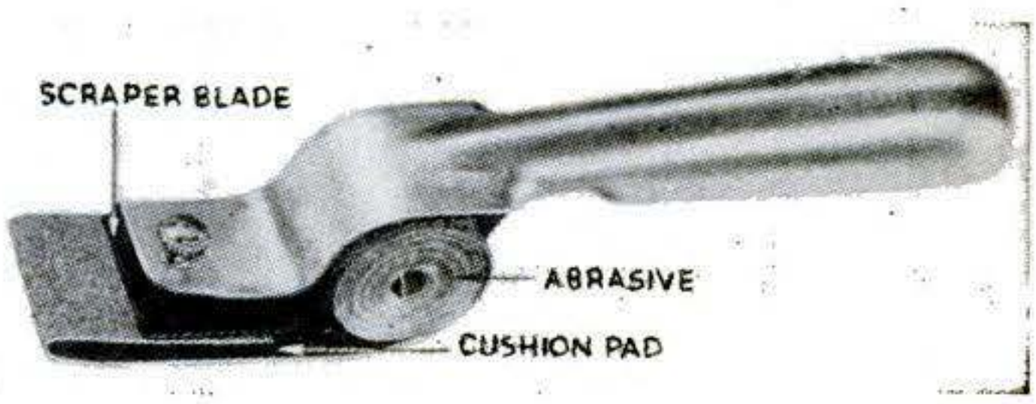
Soldering Gun Has Light. A small lamp lights the work when this soldering gun is switched on. The loop tip is at soldering heat in five seconds, and draws current only in use. Containing a built-in transformer, the gun is a product of the Weller Mfg. Co., of Easton, Pa.

Milling Done on Lathe. This indexing work holder makes it possible to use any lathe as a milling machine for bar stock up to ¾″. Mounted in the tool post of the lathe, the attachment provides full 360-deg. rotation in three directions—radially, vertically, and horizontally. Hence the work can be set at any angle. The radial adjustment is indexed to 24 divisions, set by a screw and locked by a key. Davos Products Co., of Chicago, is the manufacturer.





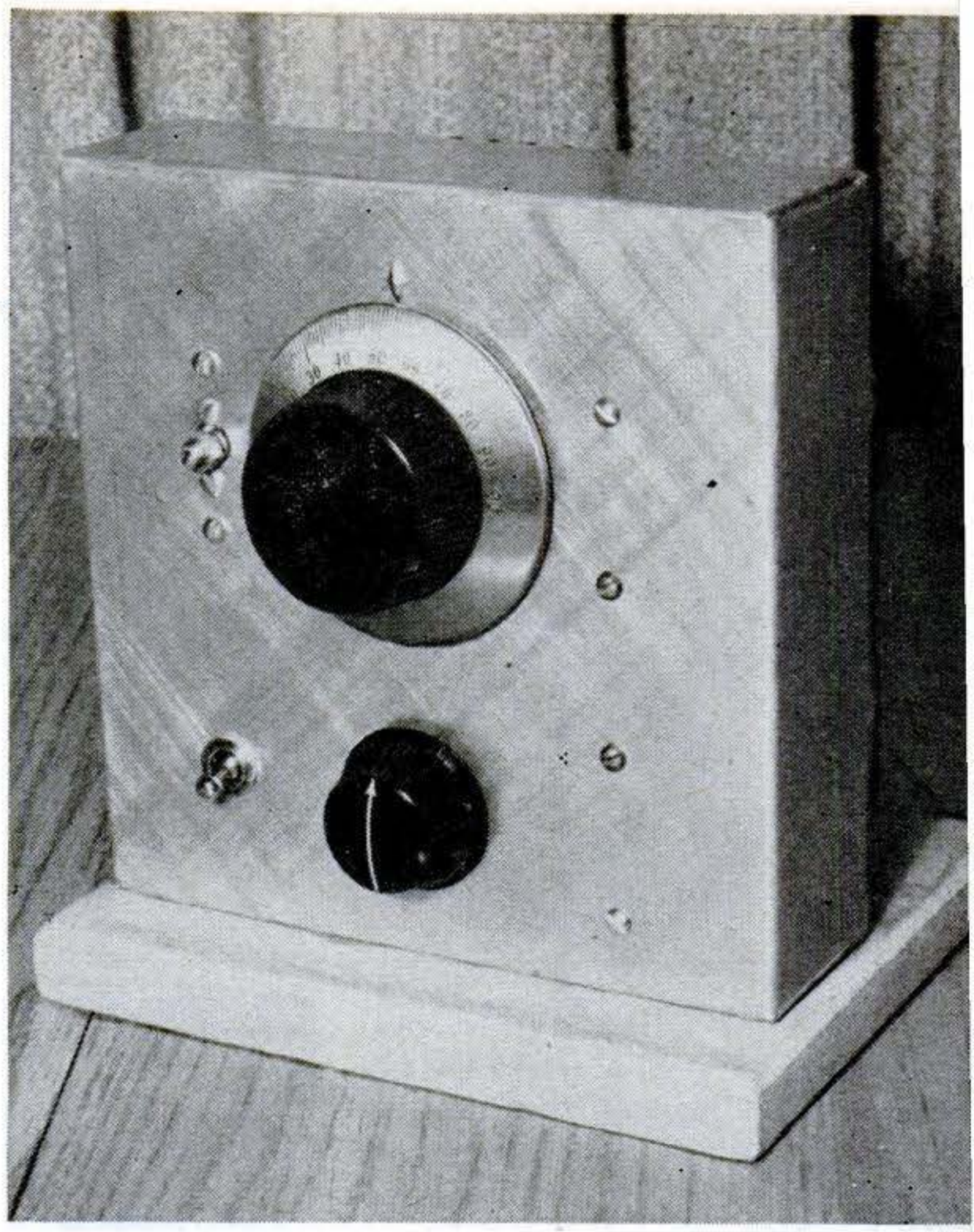
Vise Also Used as Clamp. Supplied with bars of two lengths, a combination tool made by the C. G. Schulze Co., of Los Angeles, serves both as a vise and as a bar clamp, the jaws being quickly changed from one bar to the other. As a vise, the tool may be used free or bolted to a bench, clamping pressure being applied by a toggle lever. As a clamp, the movable jaw may be set at 4″ intervals to a 68″ maximum.



Sander and Scraper Combined. A combination sander and scraper made by the Glober Mfg. Co., Chicago, has a roll of 1″ wide abrasive that may be fed to the sanding area as the old part becomes worn. A setscrew holds both the abrasive and the scraper. The latter slides out when needed.

Copyrighted material

Short-Wave Converter Brings in the World



Standing on end, the chassis becomes the front panel. The larger knob governs the oscillator condenser; the small one the mixer. Finish is obtained by drawing steel wool along a rule.

Operated with your regular broadcast receiver, this one-tuber will cover the major foreign wavelengths.

By S. T. Van Esen, W2OXD

LONDON is calling. Lima, Sydney, and Johannesburg, are on the air too. There's a wealth of news, information, and entertainment pouring out of foreign skies, just waiting for you to listen in. If you've been wanting to do just that but have hesitated because of the difficulty of building a short-wave receiver from scratch, here is your answer. It's as simple as one tube and a few coils. The rest is already built into your regular radio.

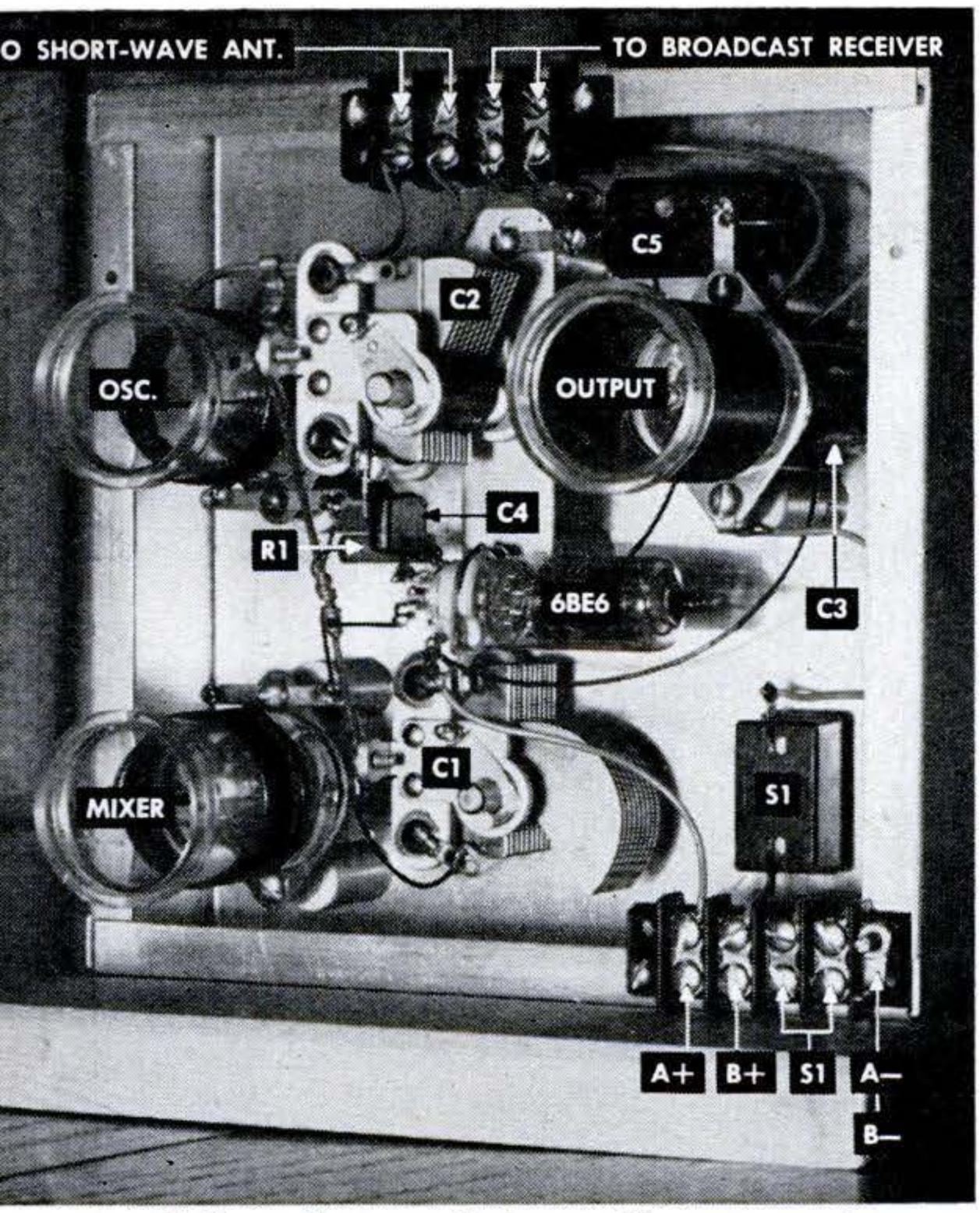
A superheterodyne will give best results, but most radios are of this type. These as well as most other kinds of receivers have everything you need for short-wave reception except that their antenna circuits are designed for a lower frequency. All you have to do is change the short waves into longer ones that can be detected by the broadcast receiver.

A converter that will do this job consists of a single tube of the pentagrid type operated in conjunction with suitable coils and capacitors. Two things should be noted about this tube: first, it is actually two tubes in one, and second, it has five grids. For simplicity, only three of them are shown in the diagram; the suppressor and one of the screen grids are omitted since their connections are made internally.

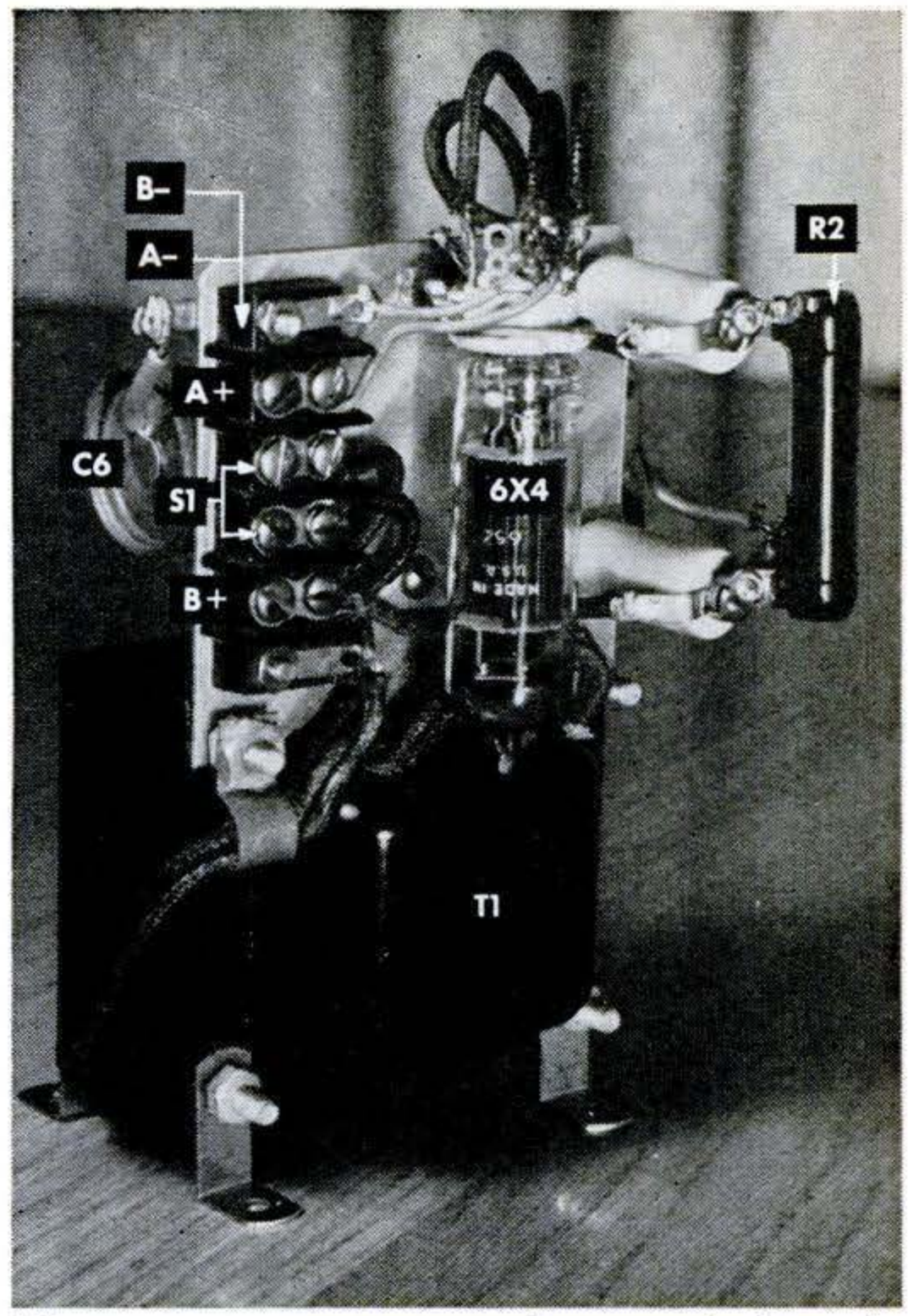
One section of this tube is called the "mixer" because the incoming or short-wave signal applied to its grid or input circuit is changed to broadcast frequency in the plate or output circuit. The other section, the "oscillator," may be visualized as a miniature transmitter. It produces a signal voltage of its own that is applied to the mixer circuit simultaneously with the desired short-wave signal.

Now let us say that the broadcast receiver is tuned to 1,500 kc. (1.5 mc.). We will then want the mixer to operate only at this frequency—that is, we want it to convert every short-wave signal within its range to 1,500 kc. To do this the oscillator must be tuned 1,500 kc. higher or lower than the incoming programs. For example, to get a foreign station broadcasting on the 6 mc. channel, we tune the oscillator to 6 plus 1.5, or 7.5 mc. By combining or "beating" the two signals together, we obtain the 1.5 mc.

Copyrighted material



Coil sockets and the oscillator capacitor are raised from the chassis by insulated spacers. Solder all leads that go beneath these parts before you actually fasten them into position.



If a separate power supply is used, the only connections to the receiver will be those for antenna and ground. Alternatively, plate and filament voltages can be tapped off an AC set.

difference that can then be applied directly to the input circuit of the broadcast receiver.

In this converter the critical tuning is done by the oscillator capacitor, C2. As we rotate the dial through its range of frequencies, any signal that is *lower* than the oscillator setting by exactly 1.5 mc. will be heard in the loudspeaker of the broadcast receiver. Strictly speaking, "image" signals exactly 1.5 mc. *higher* should also be heard, but since the mixer tuned circuits are adjusted for best response to the lower frequency, the latter will probably come in much stronger.

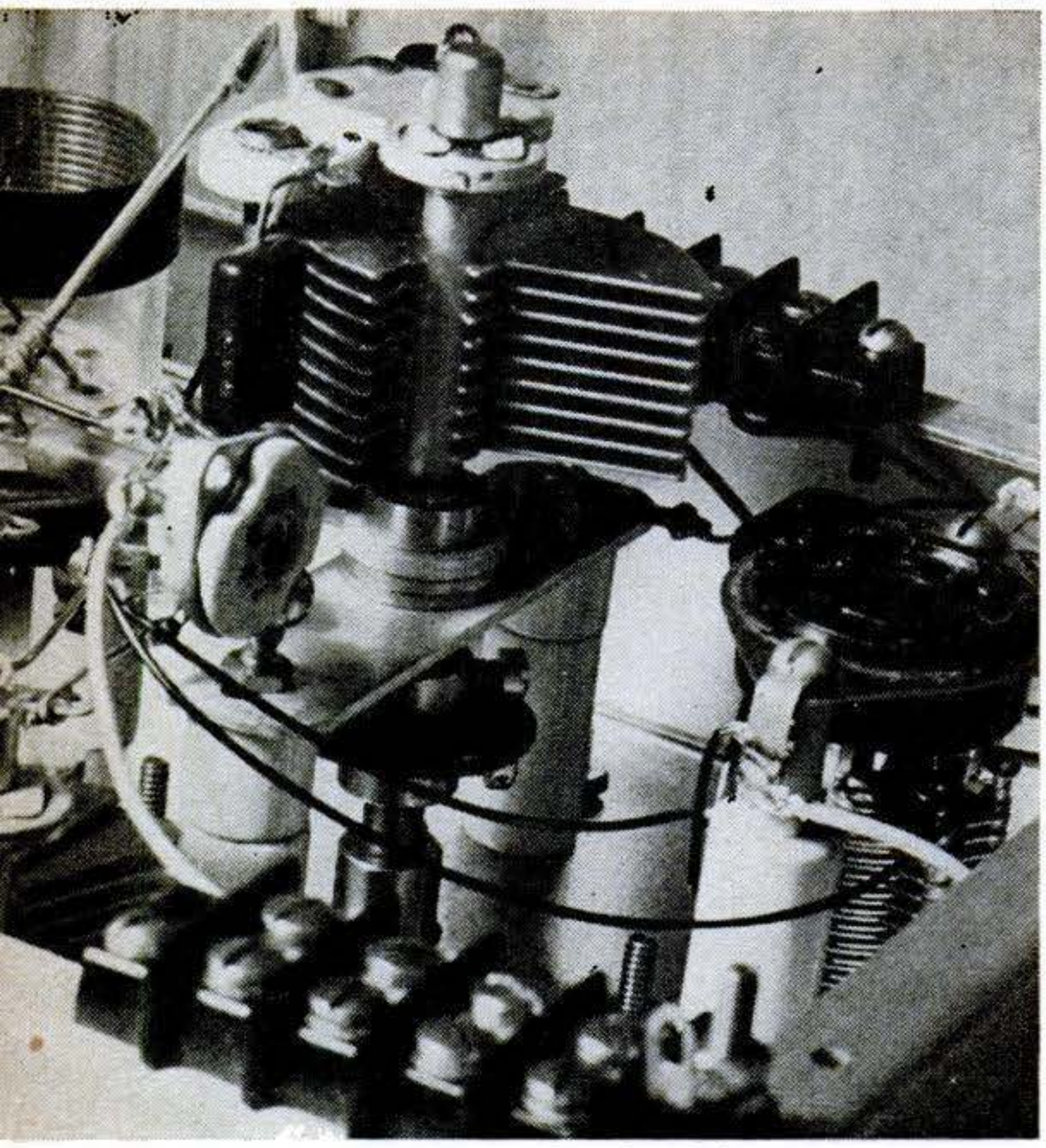
A 2″ by 7″ by 7″ aluminum chassis doubles as the front panel. Aluminum is a good choice because it can be worked without special tools. If reasonable care is taken to keep from scratching the face, it will be possible to apply an attractive cross-grain finish by pulling a small wad of steel wool against a straightedge.

Sockets for the three plug-in coils are mounted 1⅝″ off the chassis. Common ceramic stand-off insulators 1″ long were used. (They are ½″ in diameter and tapped at both ends for 6-32 machine screws.) The extra spacing was obtained by adding lengths of ¼″ aluminum tubing to the end of each insulator.

Because the type of vernier dial used has a protruding hub, the main oscillator tuning condenser also had to be spaced away from the chassis. Ceramic insulators were used here too with a metal strip bridged across them to support and ground the rotor. Details of this construction are shown in the closeup photo on page 220. The holes through which this bridge strip is fastened to the insulators are slightly elongated so that the tuning shaft can be aligned, and a flexible coupling is used to link it to the dial hub.

The tube socket, mounted to hold the 6BE6 horizontally, has a metal ring that allows it to be attached to one of the ceramic supports by means of a 6-32 spade bolt. A midget variable capacitor, used to tune the output coil, is placed directly beneath the coil socket. If there is not enough clearance between socket and capacitor, use longer aluminum spacers. Bear in mind that while the capacitor mounts directly on the chassis,

Copyrighted material



Ceramic insulators, bridged by a metal strip, hold the oscillator condenser off the chassis. The midget tuning capacitor, C3, may be seen at the right, under the output-coil socket.

LIST OF PARTS

C1, C2: 140-mmf. variable capacitor (Hammarlund type MC-140M).

C3: 75-mmf. midget variable (Hammarlund type APC-75).

C4: 50-mmf. midget mica.

C5: .01-mfd., 400-volt paper.

C6: 18-18 mfd., 450-volt dual electrolytic.

R1: 20,000-ohm, ½-watt carbon.

R2: 30,000-ohm, 10-watt wire-wound.

S1: SPST toggle.

T1: power trans., primary: 115 volts; secondary: 700 volts (at 50 ma.) centertapped, and 6 volts (at 2 amp.).

Coil forms (3) 5-prong, 1¼"-dia. polystyrene (Amphenol type 24-5P).

Coil sockets (3) 5-prong.

Tubes, 7-prong miniature sockets, chassis, knobs, misc. hardware.

it has a high voltage at both ends and therefore must be electrically separated from the chassis. Mounting inserts are insulated, and the hole through which the shaft projects must give adequate clearance.

Input and output signal leads are brought to a terminal strip on the rear top edge of the chassis; power connections center in another block at the lower edge. Power for the converter can readily be taken from most AC receivers, but where proper voltages are not available (on some AC and all AC-DC sets) it is advisable to construct a separate power supply. This will have the additional advantage of making the unit completely self-contained.

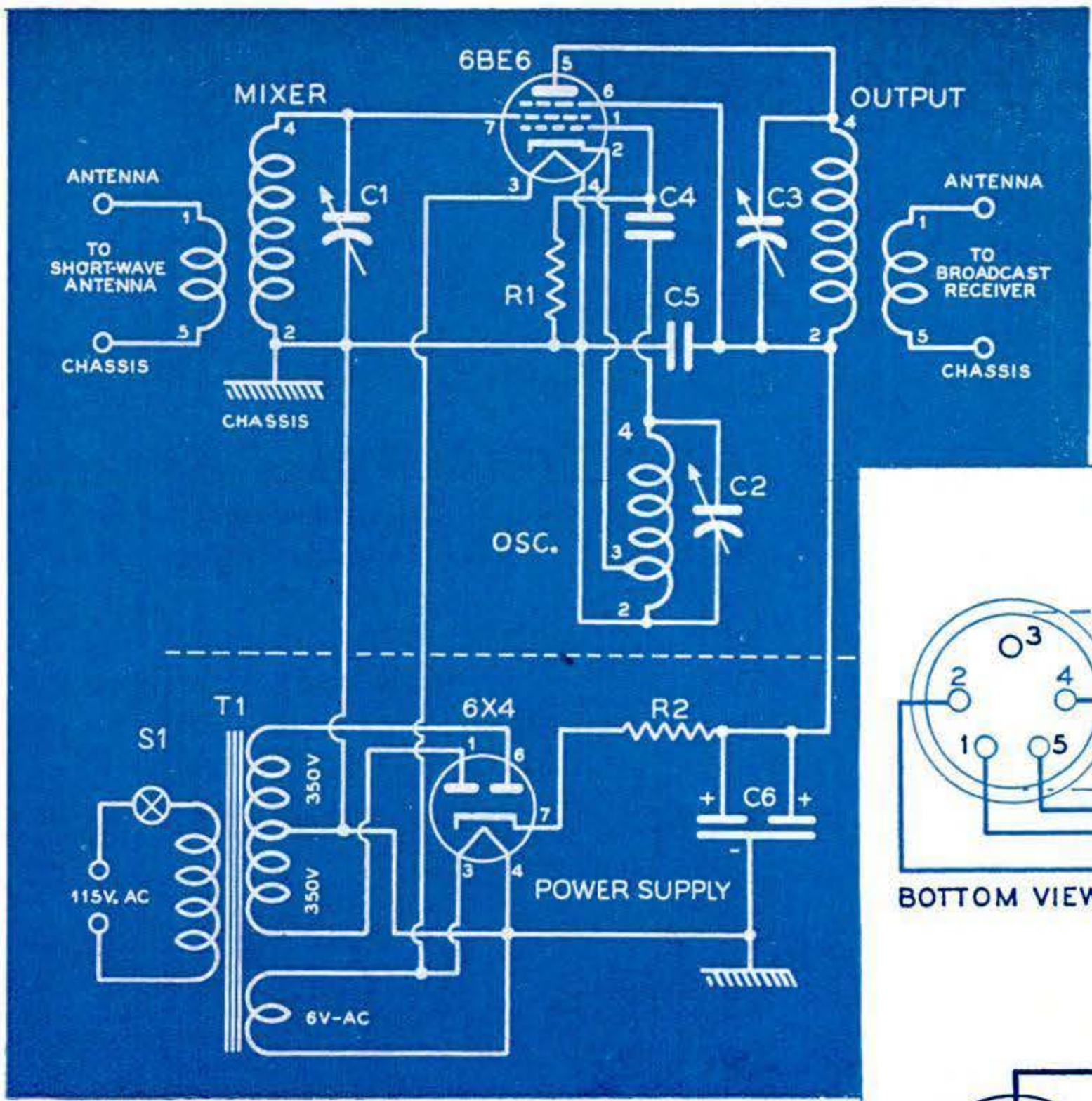
The photo of the power supply shows how the long bolts that hold the transformer-core laminations are used to support an aluminum panel upon which the rectifier tube (6 X 4), the filter capacitor, and the filter resistor are mounted. The switch could have been mounted here rather than on the converter, but the arrangement shown was found more convenient in use, and it also lessens the danger of shock by making it unnecessary to handle the high-voltage supply once it is connected.

While considerable leeway is possible in the arrangement of wiring and components, the coils *must* be as specified if proper results are to be obtained. They are worked out so that, when tuned with the capacitors specified, they will operate properly over a frequency band ranging from approximately 6 to 16 mc.

Connect the antenna terminal of the broadcast receiver to the converter; if no ground connection is provided on the receiver, wire the other end of the output-coil secondary to the chassis of the receiver through a .01-mfd. condenser. Remember that on some sets the chassis is "hot." Now set the dial of the broadcast receiver to 1,500 kc. If you get interference at this point, turn the dial slightly (toward the high-frequency end, if possible) until you have tuned out the interfering station.

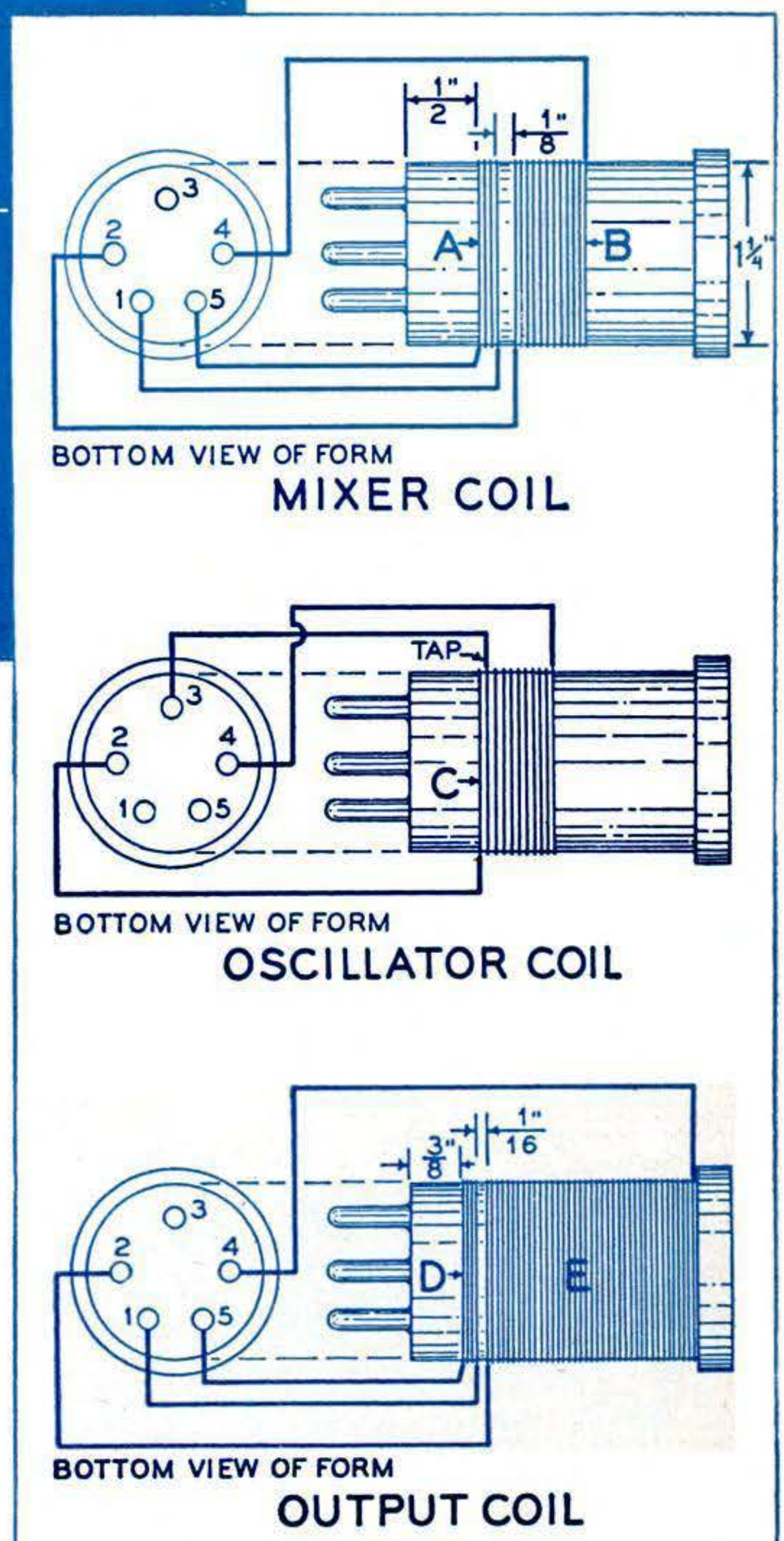
For good long-distance reception, an outdoor antenna about 40′ long should be used, although in actual tests this converter gave good results with a short indoor aerial. Connect it to the proper input post, leaving the ground lead open for the moment. Turn on the power for both sets and adjust the receiver volume control for maximum gain. Starting at the lowest frequency on the oscillator dial (plates completely in mesh), slowly rotate the knob until some signal is heard. It doesn't make any difference what the

Copyrighted material



Schematic diagram shows how to wire the simple one-tube converter and its power supply. If possible, follow the parts layout shown in photos, keeping all signal leads short.

Coils are critical. Make sure that the forms are the right size and that wire and number of turns are exactly as specified. They are calculated to cover the 6 to 16 mc. bands.



signal is so long as it is steady enough so that you can use it to peak the converter. With a fiber wand, carefully rotate the midget capacitor C3 until the signal reaches maximum strength. Now rotate the mixer control, C1, until the test signal is again brought to maximum. The ground lug adjacent to the antenna input terminal should now be touched to the chassis to see whether this increases volume; if it does, make a permanent connection.

Once these preliminary adjustments have been made, do not touch C3 or the dial of the broadcast receiver. Change stations by rotating the oscillator capacitor, and then peak the signal by careful adjustment of the mixer control.

Image signals may cause the converter to bring in the same station at two different settings of the oscillator dial. To tell which is the correct position, look at the plates of the oscillator and mixer capacitors. They should be in or out of mesh to about the same extent. However there's no harm done if you peak up on an image rather than a true signal except that dial settings will be out of proper sequence.

The range of the converter includes a majority of the international broadcast bands as well as many amateur transmissions. END

COIL DATA

All turns close wound with plain enameled copper wire; sizes as given below.

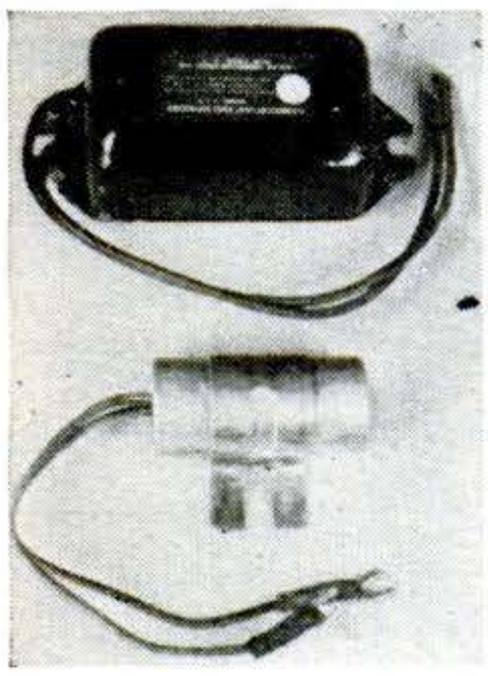
Mixer Coil:
A: 3 turns, No. 18.
B: 11 turns, No. 18.

Oscillator Coil:
C: 10 turns, No. 18; tap 1 complete turn up from bottom end.

Output Coil:
D: 5 turns, No. 26.
E: 87 turns, No. 26.

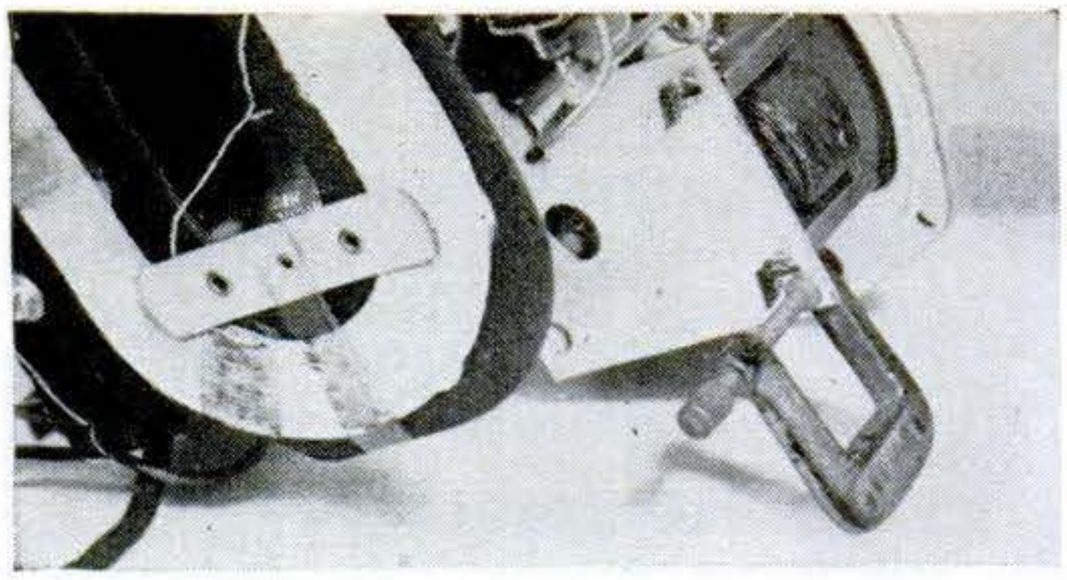
Copyrighted material

Quickly Installed Filters Cut Fluorescent-Light Static



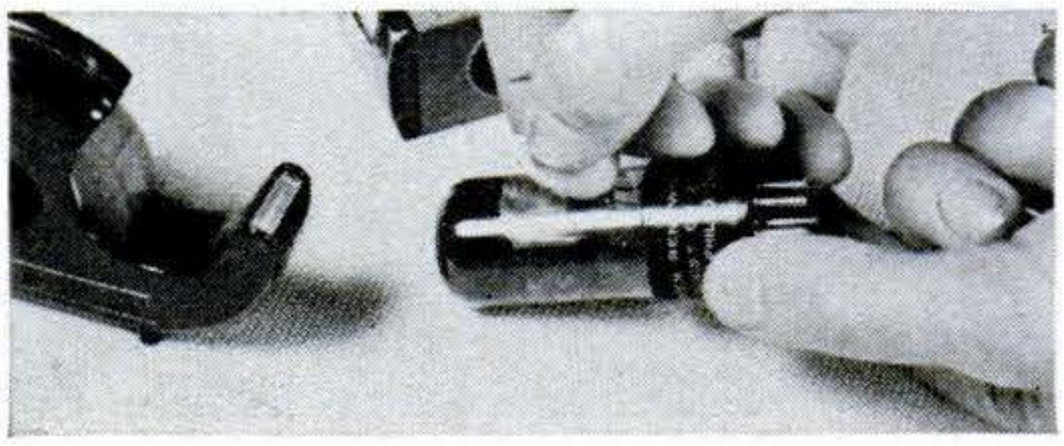
THE cool, efficient illumination that you get from fluorescent lights is almost matched on the debit side by the static they cause in radio and television receivers. If you have installed any of these new lights you can do yourself and your neighbors a favor by adding line filters. Many condenser manufacturers produce filters that keep the high-frequency disturbances out of the electrical wiring system by by-passing them to ground.

A typical unit—the smaller one in the photo above—consists of two capacitors connected in series with the center part grounded to the case. When the leads are wired across the line and the mounting bracket is bolted to the lamp reflector, both conducted and radiated interference are sharply reduced. A separate filter should be used on each fixture, and for multiple units a larger filter (top) is recommended; it is connected in series with the 115-volt line. It is advisable to use the larger-capacity type if a television set is in operation since it protects the video as well as the broadcast frequencies.



Clamps Steady Radio on Bench

COILS or tubes are sometimes damaged when a radio chassis is placed on the workbench for servicing. To keep weight off these parts and lessen the chance of breakage, attach one or two C-clamps as shown to support and steady the set.—H. LEEPER.



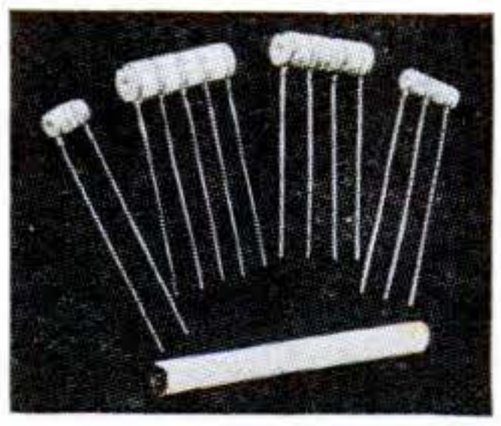
Tape Shields Tube Numbers

EXPERIMENTERS who keep a supply of tubes on hand often find it impossible to identify some because the type numbers have been worn away through handling. This won't happen if you put clear cellulose tape over the number when the tube is new.

Floating Arm Adapted to Mike

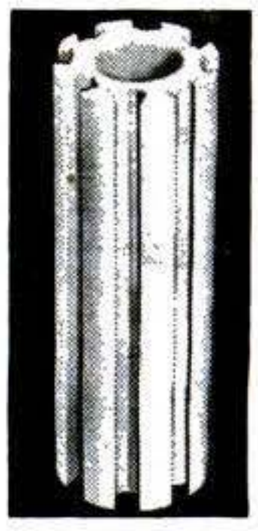
GETTING a microphone into the desired position quickly is no problem with this completely flexible arm that moves in any direction and stays exactly where you put it. Long in use on desk lamps, it is now made available with mike fittings by Dazor Manufacturing Corp., St. Louis.

Tiny Resistors Are Accurate



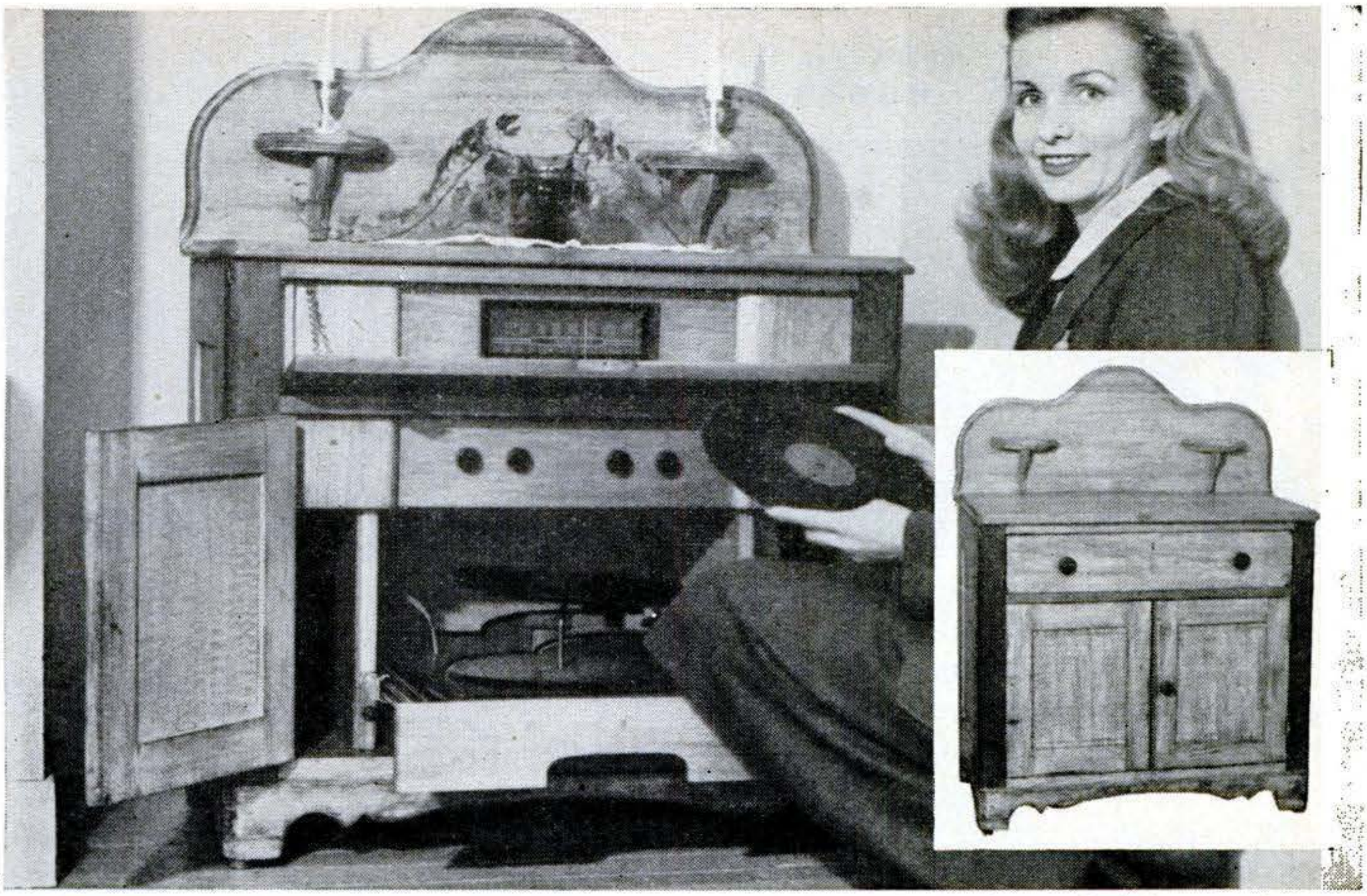
MINIATURE precision resistors, built to a standard tolerance of 1 percent, have been announced by the Shallcross Manufacturing Company, Collingdale, Pa. The smallest single unit is 15/32" long. Other types with two to four sections have also been produced.

Form Is Easily Tapped



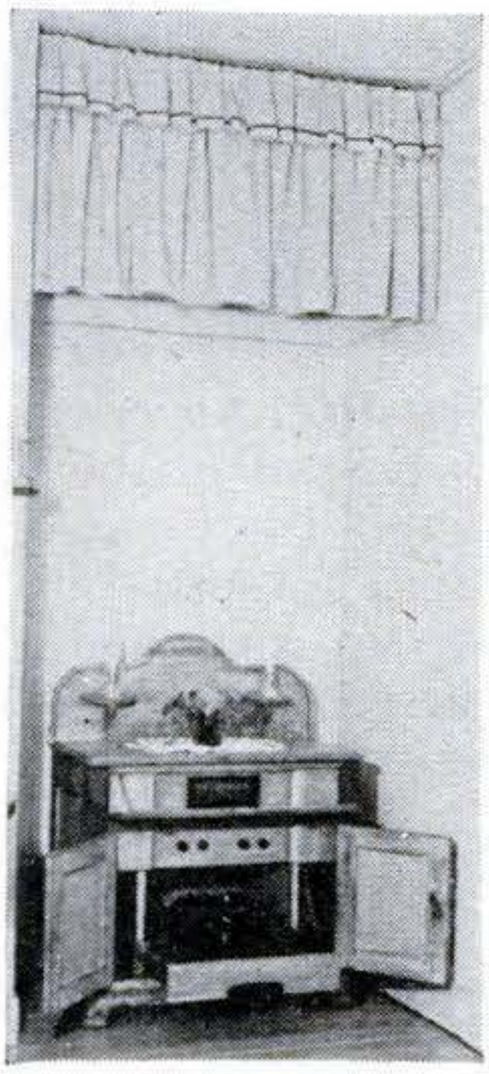
A FLUTED coil form made by Henry L. Crowley & Co., Inc., West Orange, N. J., eliminates the need for special holes and will take a tap from any part of a winding. Matching terminal clips and bases are available.

Copyrighted material



Cabinet doors and hinged drawer front reveal—or conceal—the radio and slide-out changer.

Pine Washstand Holds Phono-Radio



A RADIO and phonograph console that harmonizes with pine furnishings isn't easy to find in the music shops, but its parts can be assembled without great difficulty. This unit was put together at a fraction of what the complete set would cost, and it has become the showpiece of the room.

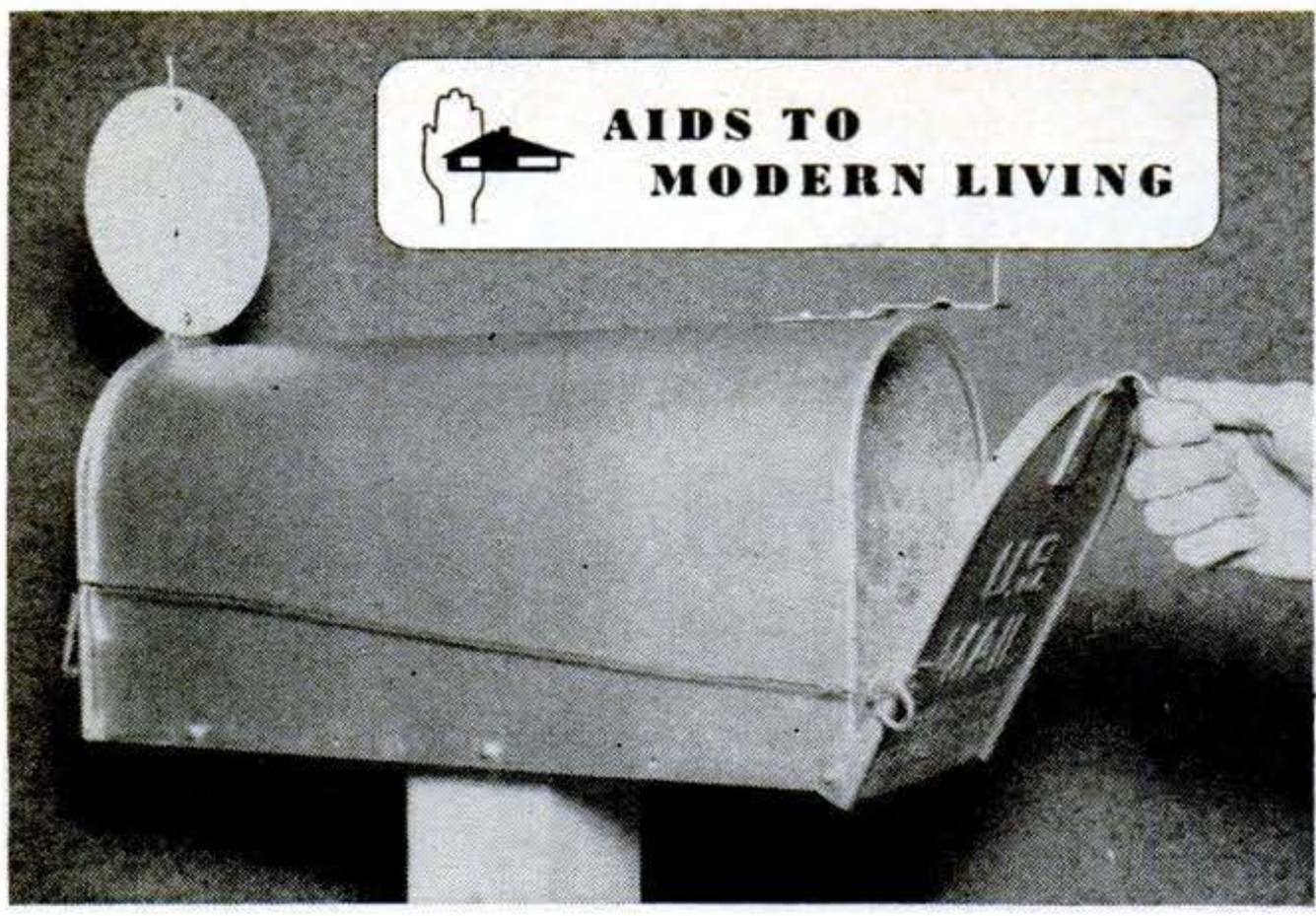
Better-than-average radio equipment was bought new; the cabinet is a colonial washstand that was picked up at a bargain because it needed refinishing. The photos above show two views of the completed set, and at the lower right you can see the cabinet with the works removed. All parts are accessible for repair.

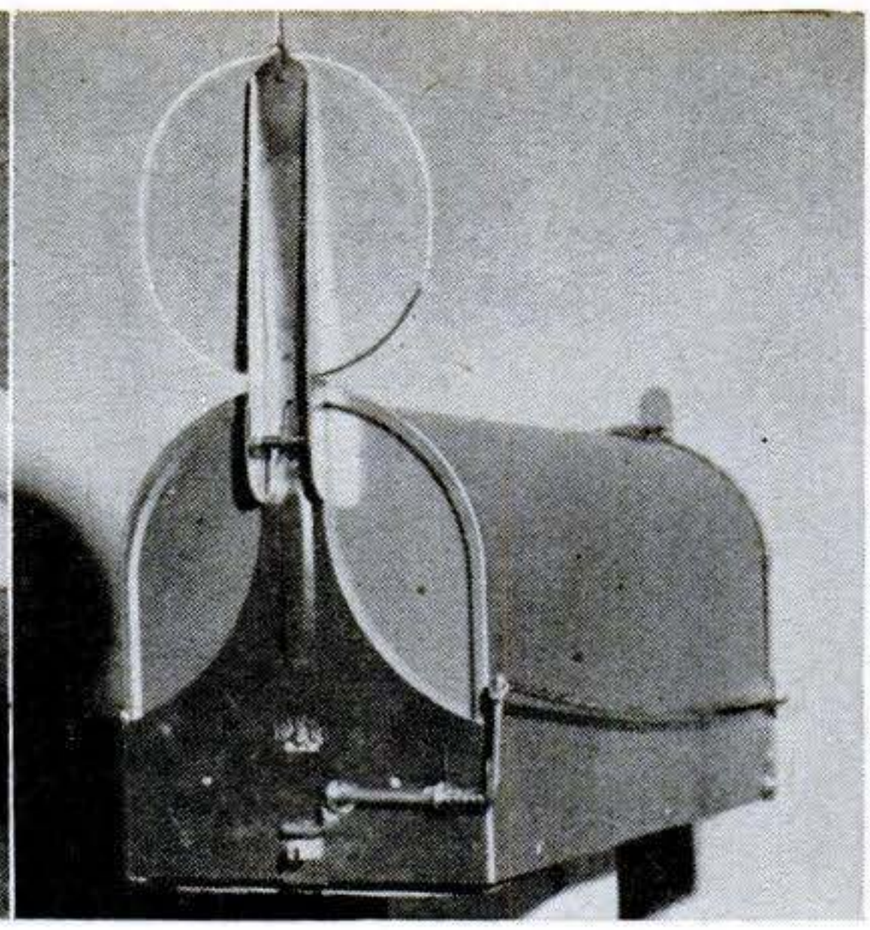
The face of the drawer above the doors was hinged at the bottom; it drops flat to expose the dial. A supporting frame was built for the record changer, and the unit mounted on slides so that it can be withdrawn for loading and unloading. The ball-bearing slides for this purpose may be purchased at a hardware or radio-parts store.

Although there is ample room for a speaker inside the stand, the existence of a very suitable alcove made possible the arrangement pictured at the left. A shelf was built across the upper part of the recess in which the console stands; the speaker was baffled into this space, and a short drape hung in front of it. The extra room in the cabinet is utilized for record storage.—JACK McGHIE.

Copyrighted material

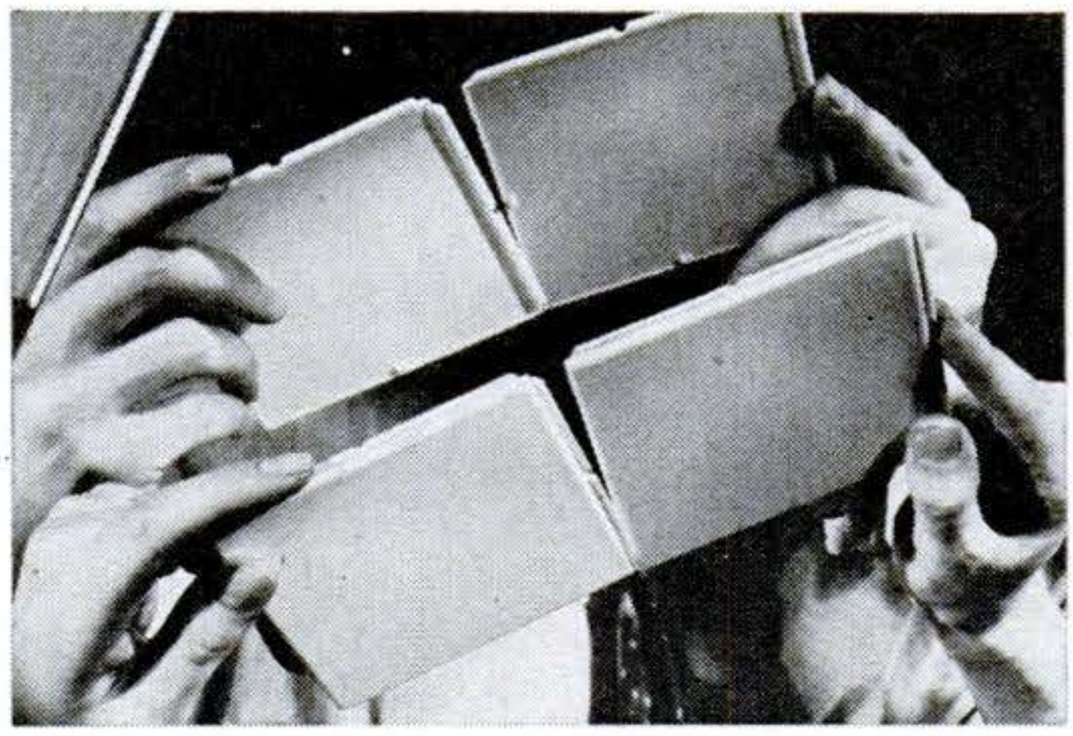
AIDS TO MODERN LIVING



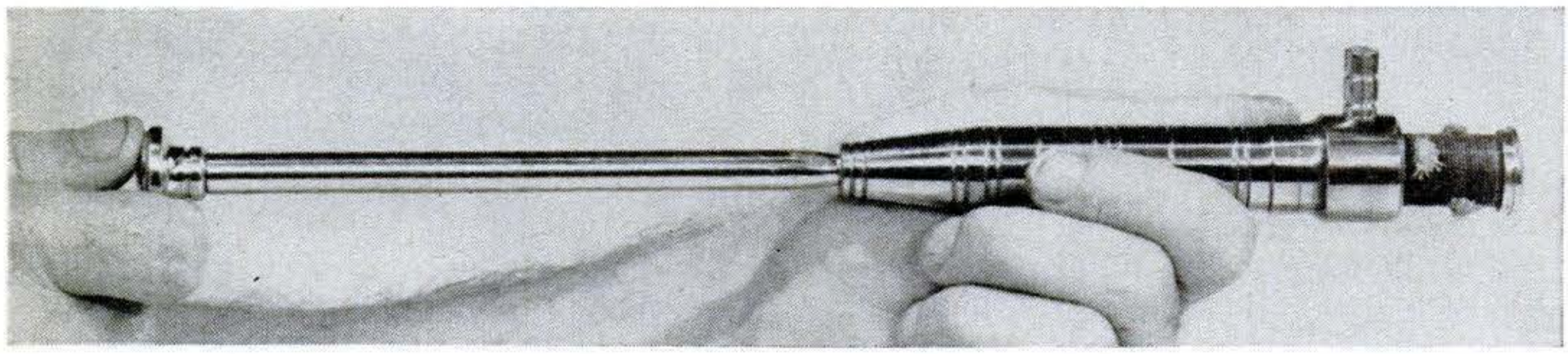


The Mail's Here! An attachment for rural mailboxes offered by the Tell-O-Mail Company, of Portland, Ore., automatically signals the arrival of mail. When the mailman opens the box door, a connection trips a trigger on the rear, allowing a spring to throw a yellow disk above the box. When the box owner comes for the mail, he snaps the disk down again, ready for the next delivery. The attachment sells for about $3.

Brush Holder Also a Funnel. Fitted snugly on the rim of a paint can, a device produced by the B & W Manufacturing Company, of Indianapolis, serves both as a brush holder and as a pouring funnel. Plated to prevent rust, the holders are available in sizes to suit either quart or gallon cans. The retail price is about 20 cents.

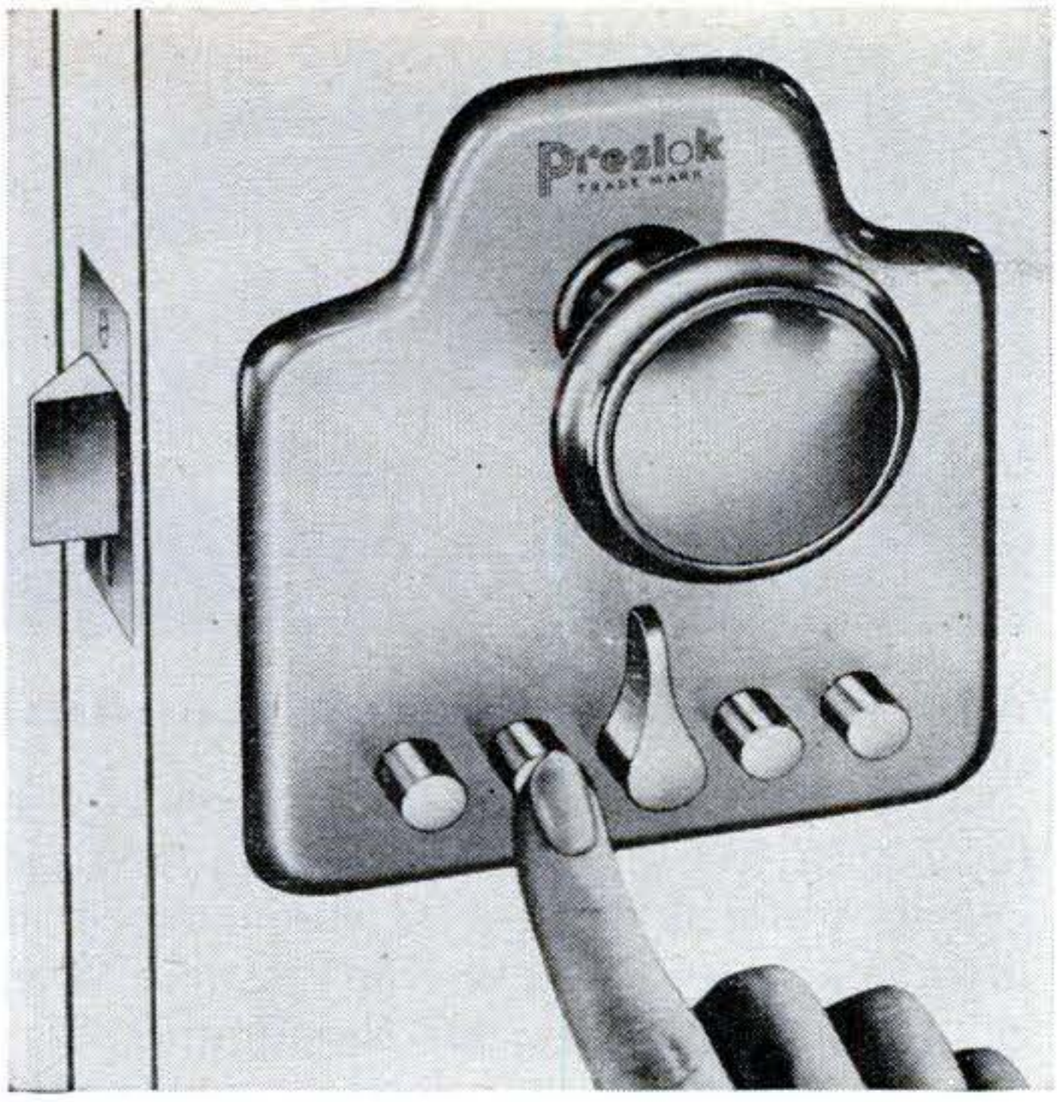


Tile Needs No Cement. Anyone can tile a room with a new type of plastic tile produced by the Pittsburgh Tile Company, Pittsburgh, Pa. These tiles are joined by a tongue-and-groove type lap joint and do not have to be filled in with cement, the self-aligning joints being watertight. Adhesive is used to attach the tiles to a wall.



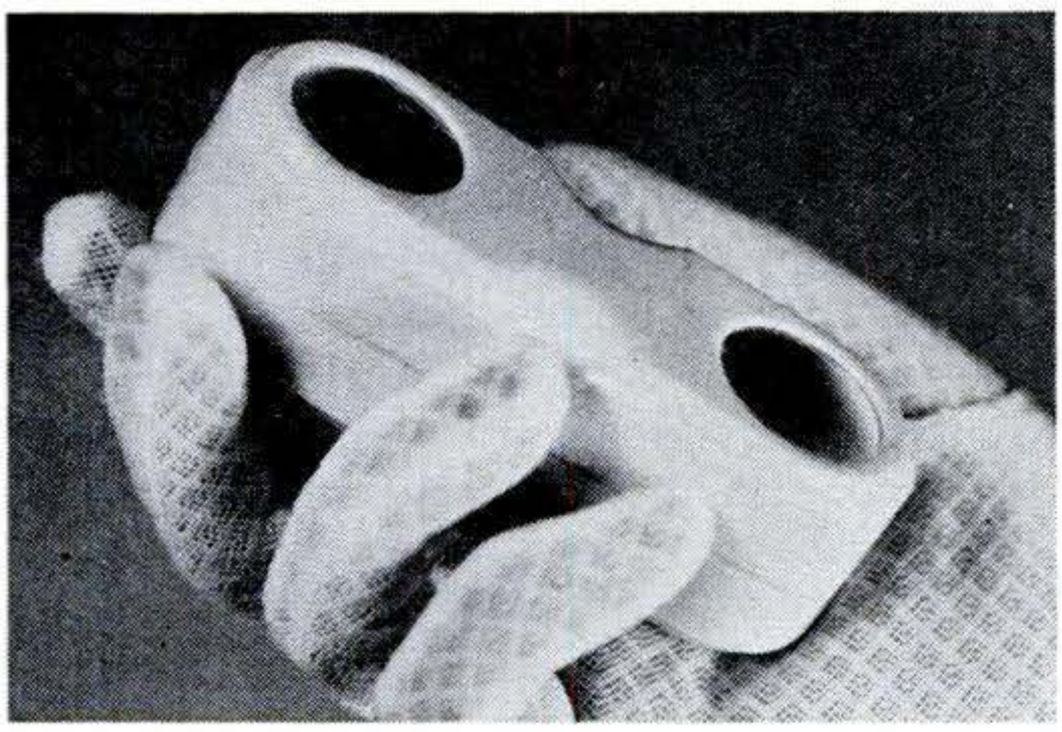
Lighter Helps Start Fires. The ordinary cigarette lighter has now been adapted for use in kindling a fire in your fireplace. Crescent Industries, of Detroit, offers the lighters in 12″, 24″, and 30″ lengths at prices from $3.75 to $8.75. Sliding the barrel strikes a spark, igniting four wicks. Any lighter fluid may be used.

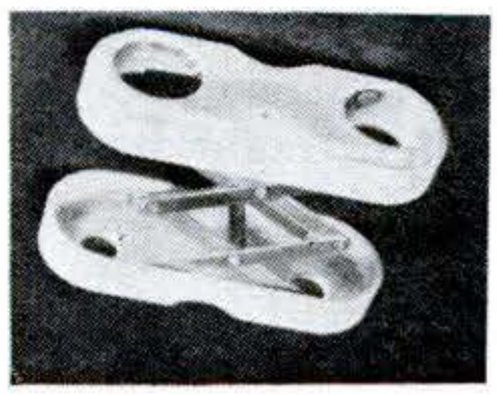
Copyrighted material



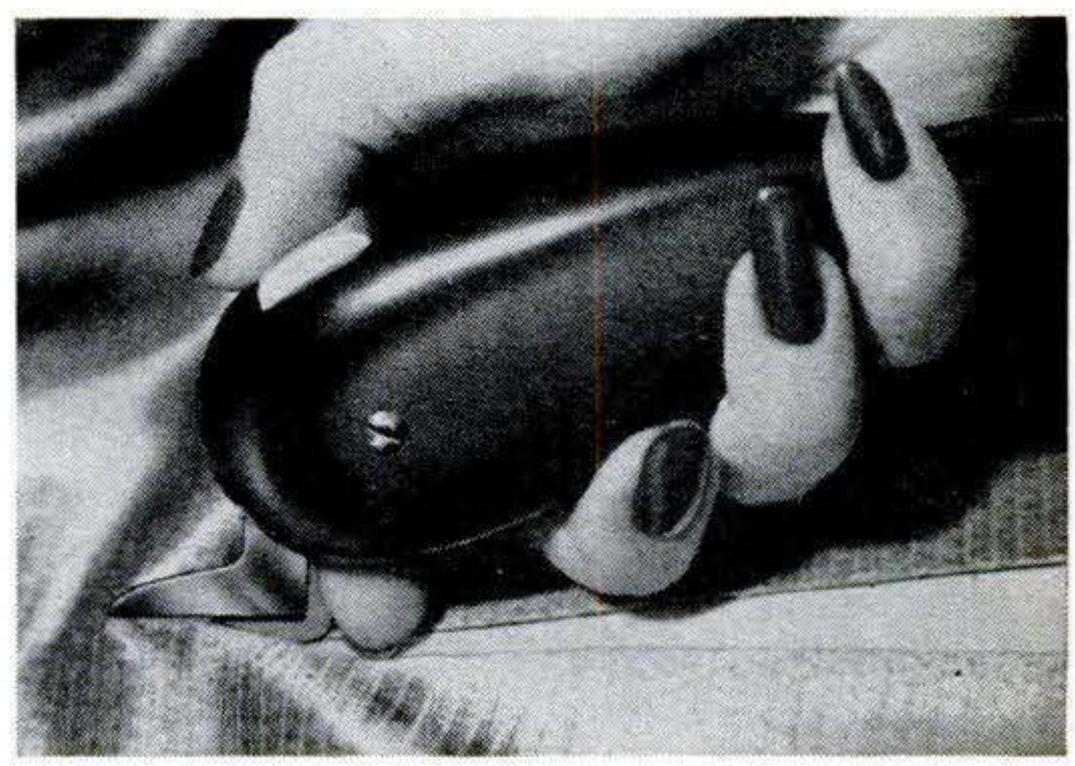
Lock Works on Combination. To open a door equipped with a new keyless lock made by the Security Lock Corporation, of Walden, N. Y., you must know the combination. It locks when the center lever is flicked, but to open it you must tap out the proper combination on the four buttons. The lock has virtually unlimited combinations, and it's built so you may easily change the combination whenever you see fit.

Valve Regulates Heat. A steam radiator valve that automatically controls the temperature of each radiator on which it is placed is being marketed by the Heat Timer Corporation, of New York City. Installed in place of the ordinary air valve, the new one has a movable indicator on a scale of temperatures. A thermostat inside keeps the valve closed as long as room temperature remains at the desired level.



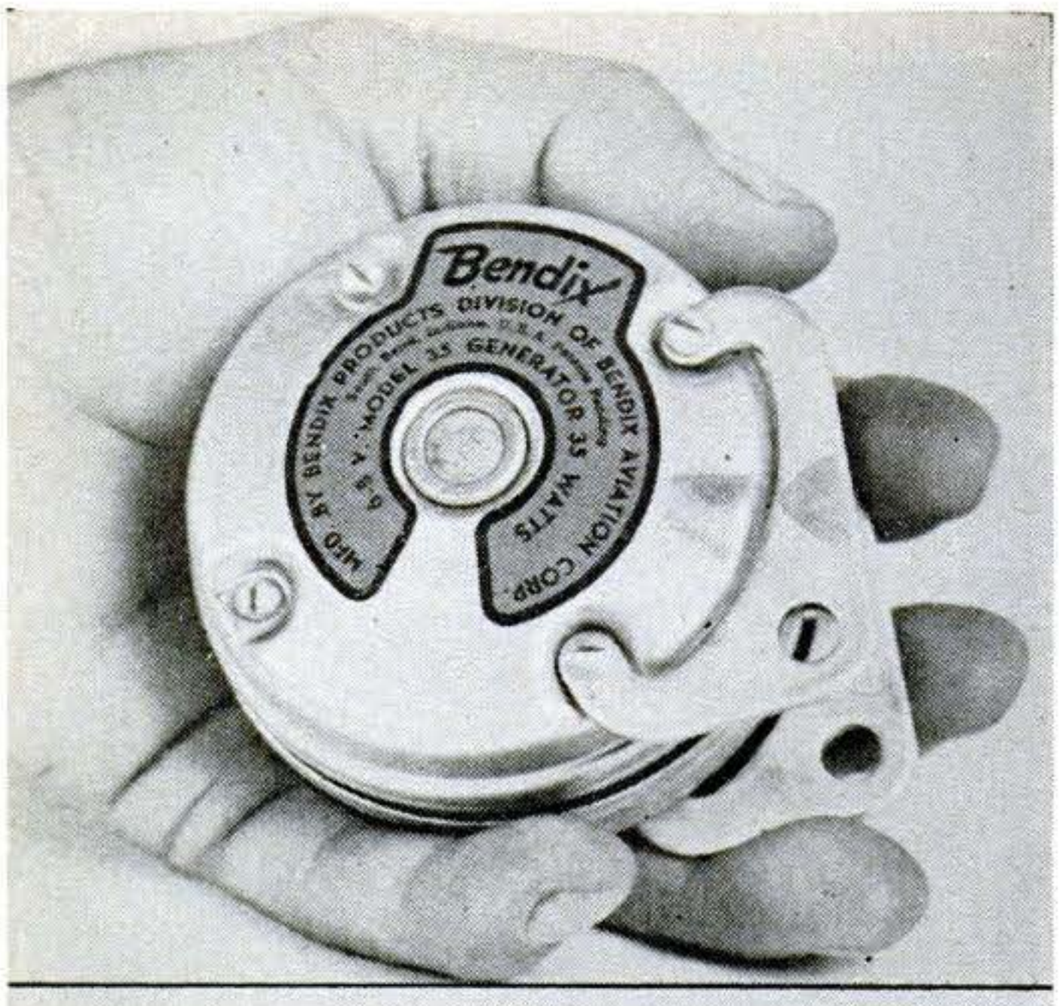


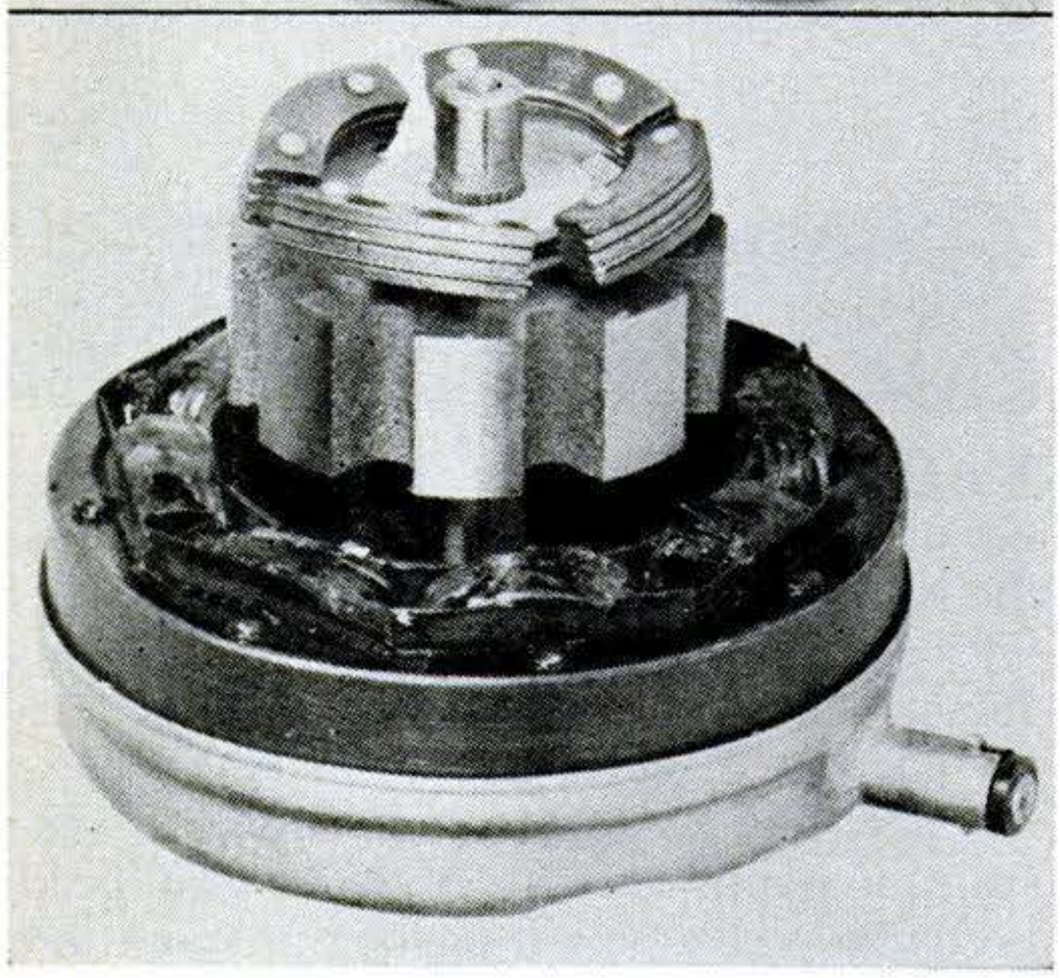
Glasses Fold. For carrying, these binoculars fold into a compact 1¼″ by 1¼″ by 4″ size, easily placed in your pocket. When opened for focusing, they extend from 3¼″ to 4″. A product of the Porto-Sight Company, of Kansas City, Mo., they weigh less than 2 oz., have an optical power of 3, and, except for the folding mechanism, are made entirely of plastics—including the lenses. They are available in either black or ivory for about $2.



Scissors Run by Electricity. The vibrating jaws of electric scissors made by the Atlas Instrument Co., Haddonfield, N. J., will cut fabrics ranging from several thicknesses of woolens to fine cottons or silks. Controlled by pressure on a button, the device can be guided around intricate curves as well as in a straight line. With a 6′ cord and a leatherette case, the unit sells for about $10.

Copyrighted material





Lamp Magneto Governs Itself

A COMPACT magneto to supply current for lights on motor bicycles and scooters is self-regulating, keeping output uniform from idling to maximum speeds. Driven from the engine flywheel or a tire, the rotating member is an Alnico Ⓣ magnet with eight poles, turning inside eight stationary coils.

Four laminated segments are attached to the rotor by separate leaf springs of different strength, which at low speeds hold them clear of the magnet poles. As speed increases, one segment after another flies against the magnet poles, each bridging a pair. This progressively "short-circuits" the magnetic field, holding current output constant despite higher speed.

The compact generator is only 1½" thick and 3½" in diameter, and develops enough power for a 30-watt sealed-beam headlight and a taillight. Made by a division of Bendix Aviation Corporation, South Bend, Ind., it is available only to manufacturers.

Air Pistol Is Breech Loading

SAID to have enough muzzle velocity to form a 1" test grouping, at 30', a new target air pistol is cocked by "breaking" it to draw back a spring-driven piston. Two calibers are available for shooting .177 or .22-cal. pellets, both priced at about $20 with ammunition and targets. The gun has a rifled barrel, and ammunition is loaded into the breech. Hy-Score Arms Corp., Brooklyn, N. Y., are makers of the air pistol.

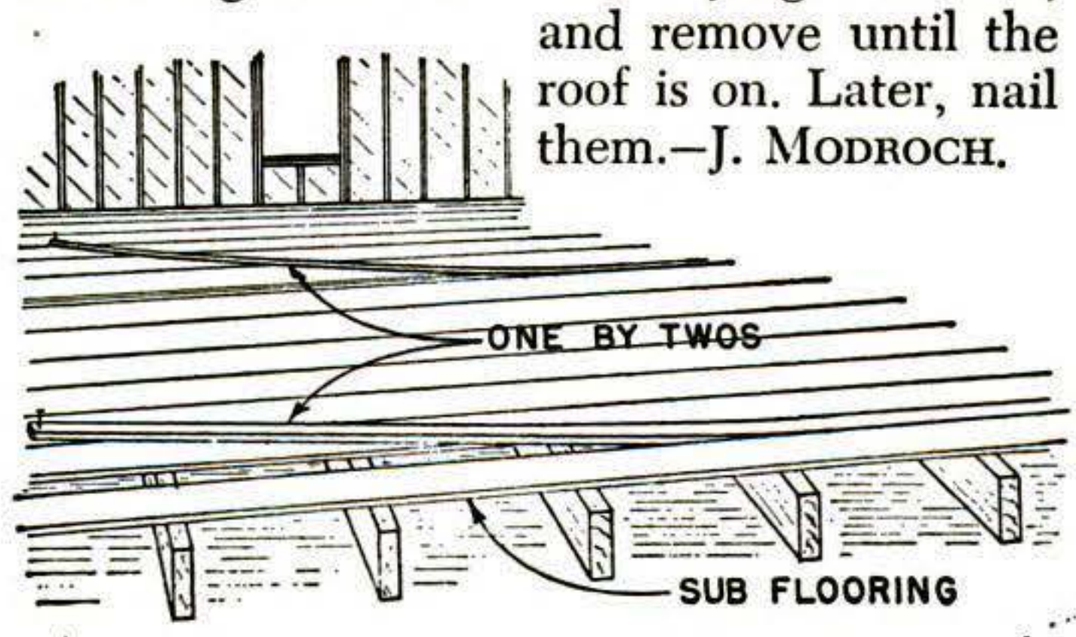
Removing Tape from Skin

ADHESIVE tape commonly leaves stubborn traces of itself on the skin after it's peeled off. Alcohol or turpentine will get them off, but if neither is available you can use the tape itself, sticky side out, like an eraser to rub off the clinging bits.—H. SAMUELS.

Spaces Let Subflooring Expand

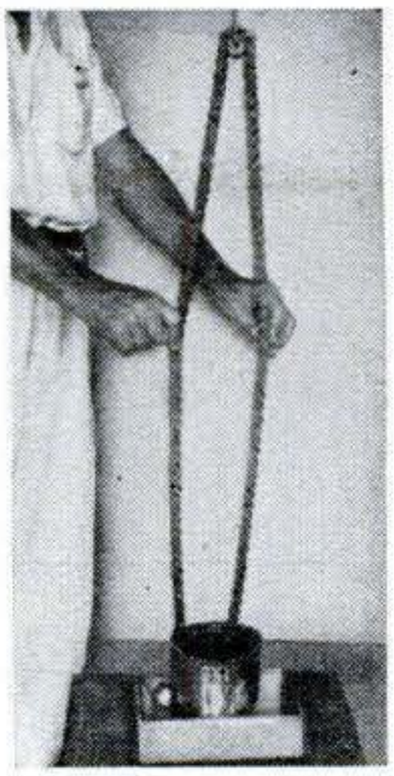
DRY subflooring will become swollen if a prolonged rain occurs before the roof has been put on a new building. The tremendous pressure developed can cause serious displacement of walls and partitions, unless spaces are left to let subflooring expand.

One way of leaving such spaces that makes it easy to fill them in after the roof is on, and the danger of swelling is past, is to lay in common one-by-twos temporarily. Simply insert one between every seven or eight boards when laying the floor, and remove until the roof is on. Later, nail them.—J. MODROCH.

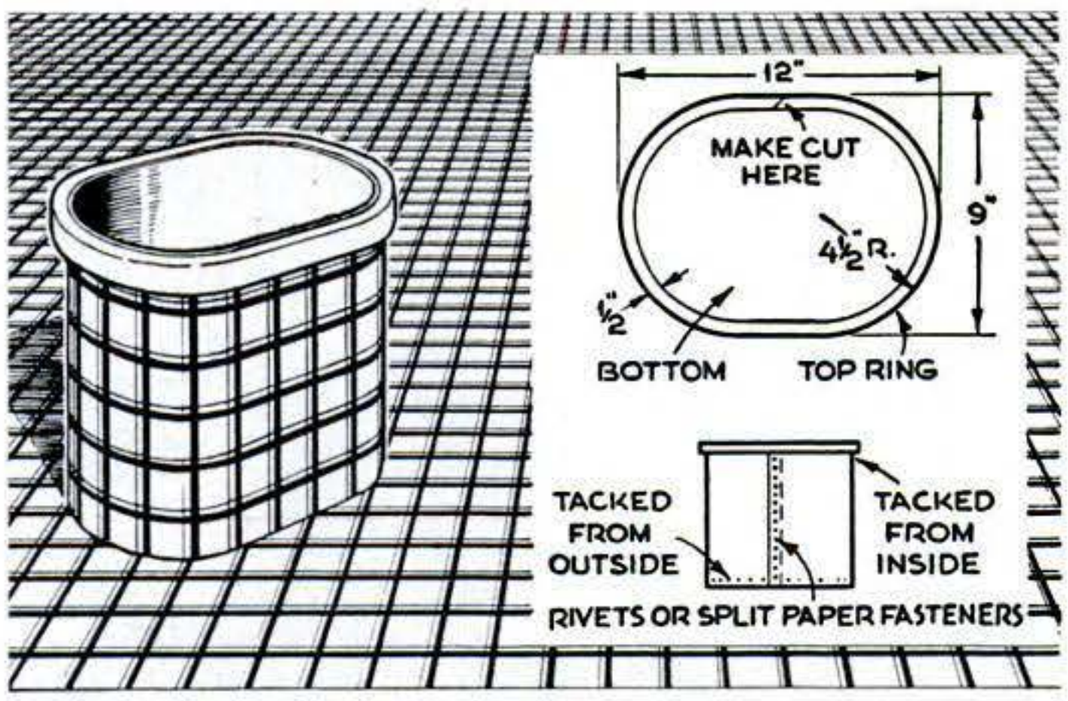


Copyrighted material

Spool Helps Clean Bike Chain



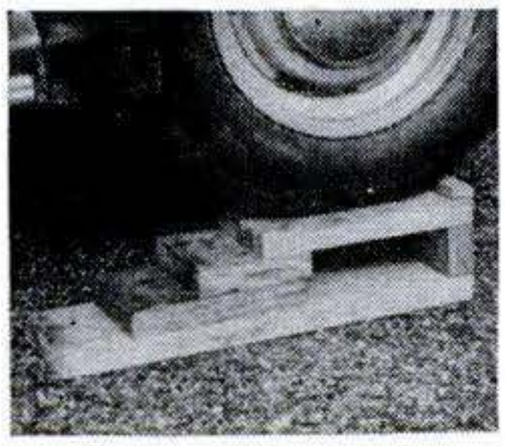
TO CLEAN a bicycle or motorcycle chain thoroughly, in even a small can of fluid, push a big nail through a wooden spool and drive it into a wall or post a bit higher than the doubled chain's length above the floor. With the master link reconnected, run the chain over the spool through the fluid.—JIM POOL.



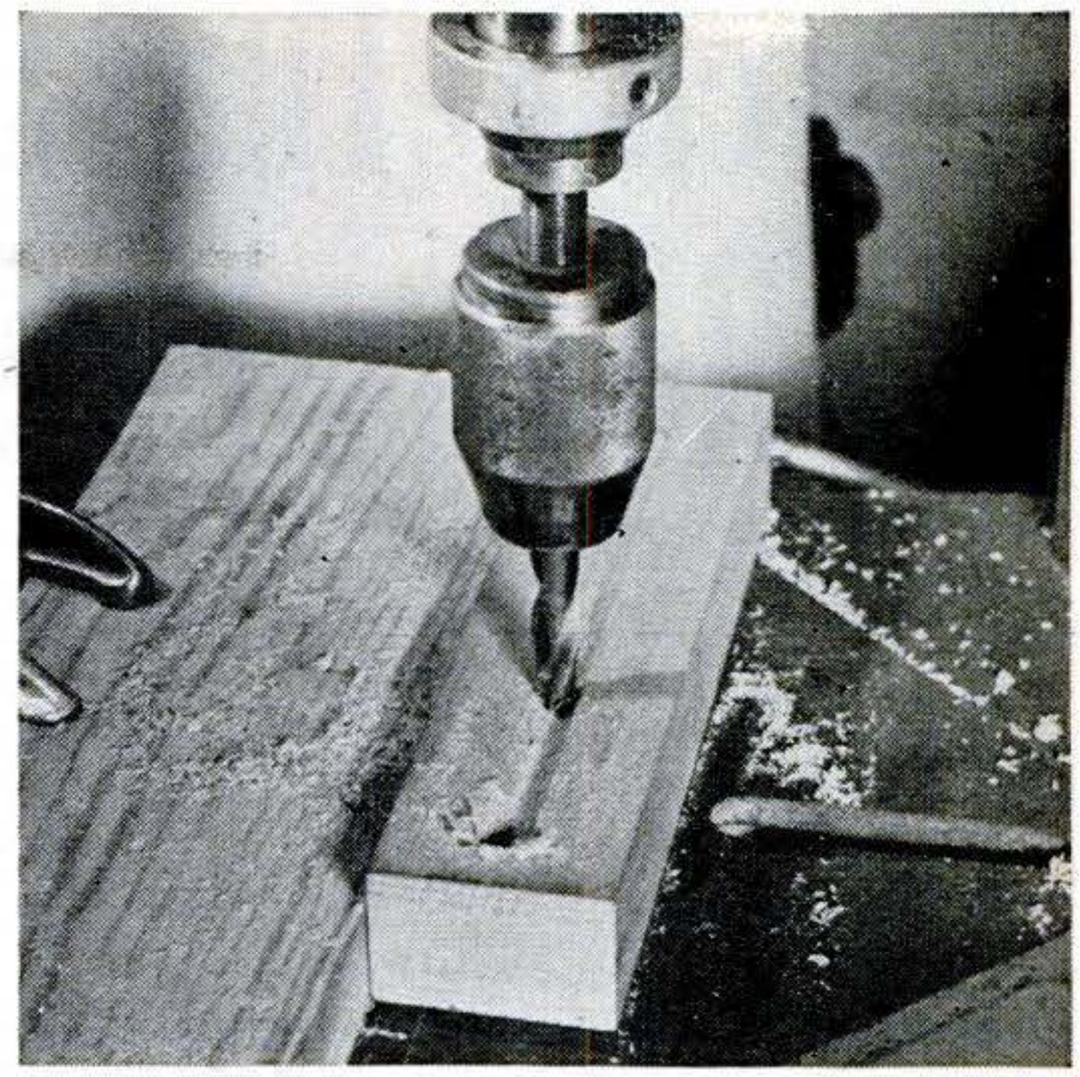
Wastebasket Matches Floor

SCRAPS of linoleum and a 9" by 12" piece of ¾" wood make a surprisingly sturdy wastebasket. The one I built will readily support 170 lb. The wooden parts are cut as shown—first the outside contour, then the top ring, which leaves the bottom. Other shapes can be made the same way. Use small tacks in fastening the linoleum to the ring so as not to split the wood. A dab of glue in the joint will reinforce it, and the ring can be painted a trim color for decorative effect.—JOSEPH R. ZEBROWSKI.

Blocks Raise Car for Mechanic

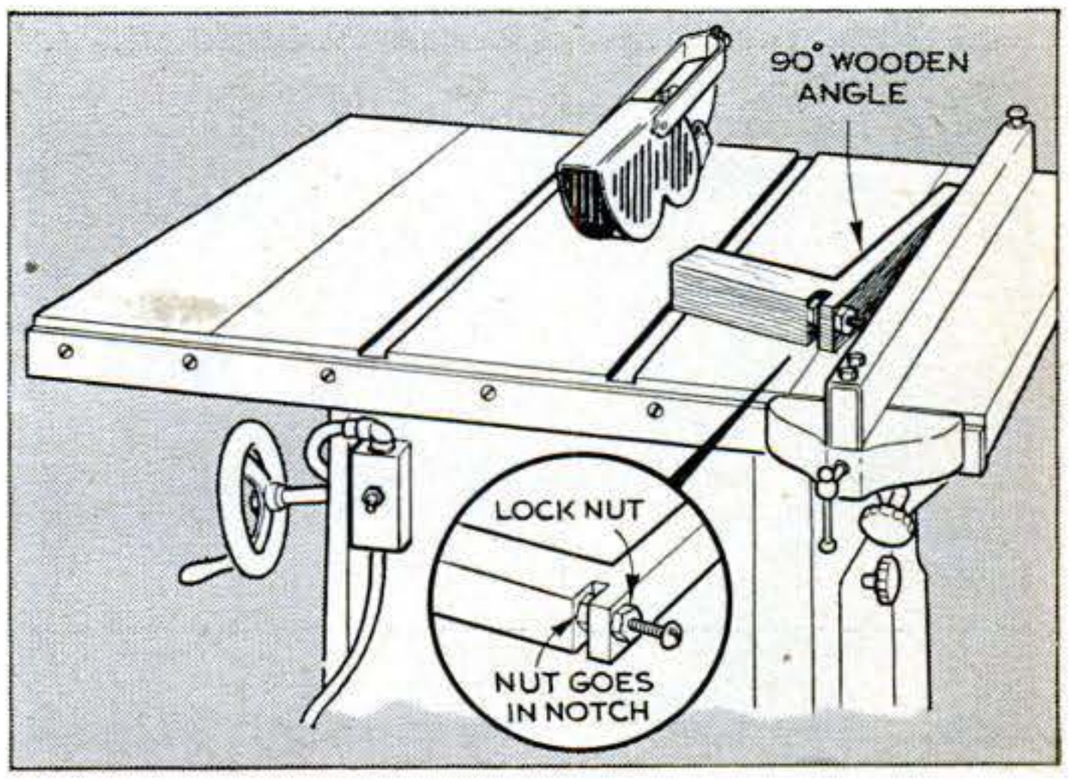


NAILED together from short lengths of two-by-eights, two of these blocks provide a car support you simply drive up on. The base is 26" long. Each step is set back 4", the top being 14" long. The single end support equals the height of the two center lifts. Nail on a strong stop cleat, and don't forget to chock the other wheels securely both fore and aft when the car is up on the blocks for work.



Router Ground from Old Drill

NEXT time you wish you had a round-bottom router, why not make one? All you need is a broken drill about ½" in diameter. Break or grind it to half its original length. Then rough-grind the end round, without any cutting-edge clearance as yet. Chuck it in a lathe or drill press and with a coarse oilstone finish rounding the tip evenly. Then go back to the grinding wheel and carefully grind clearance back of each cutting edge without changing the spherical shape. You can use the router freehand to rough out hollow parts in carved trays and similar pieces, or with a fence on the drill press for forming decorative grooves.



Angle-Sawing Jig is Variable

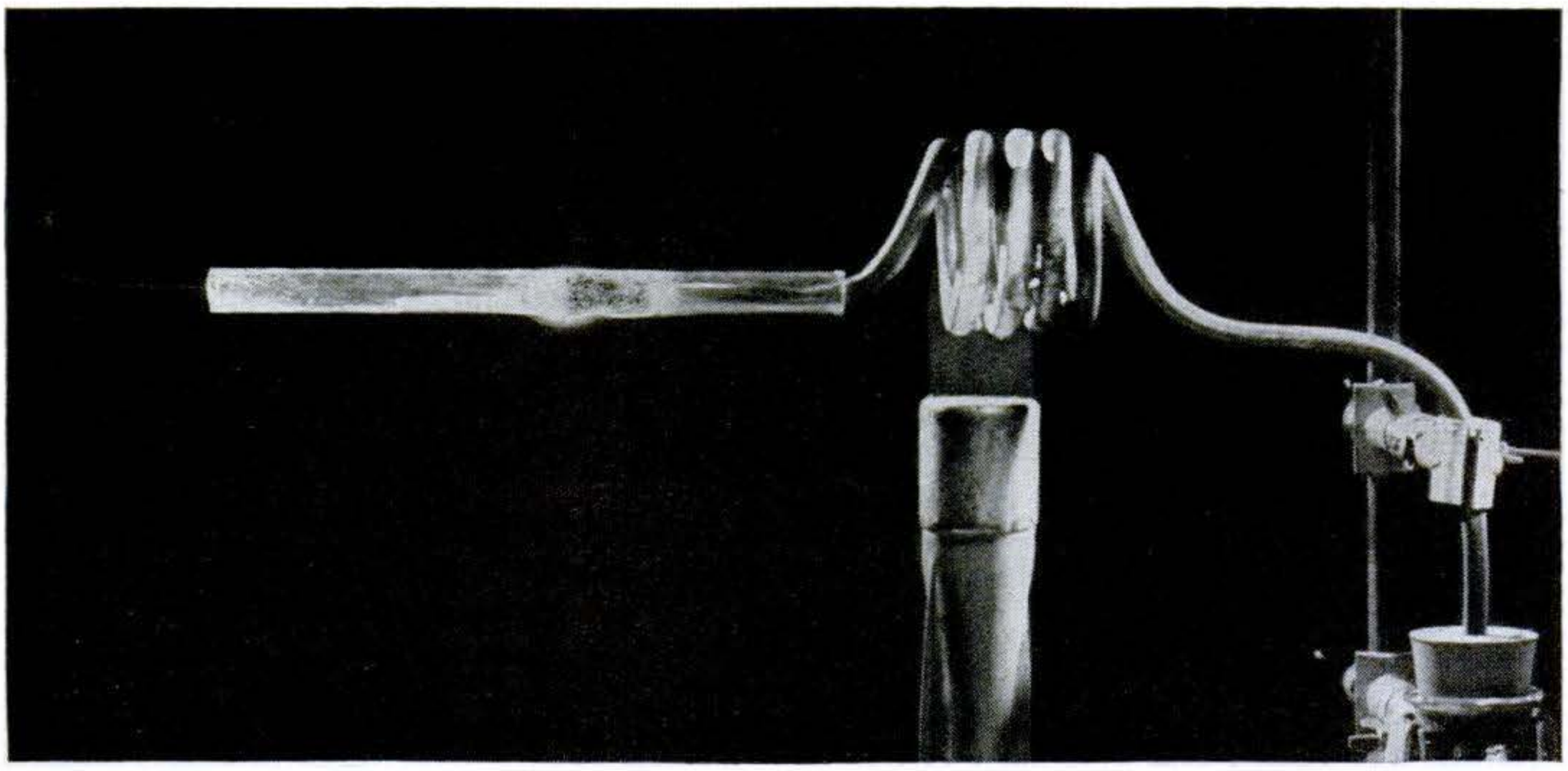
THIS improved jig for cutting wedges and short tapers is adjustable for various angles. Glue it up of several pieces of hardwood with the grain crossing for ample strength in the corner. The far tip and the bolthead slide against the fence.

Copyrighted material

Steam That's Hot as Fire

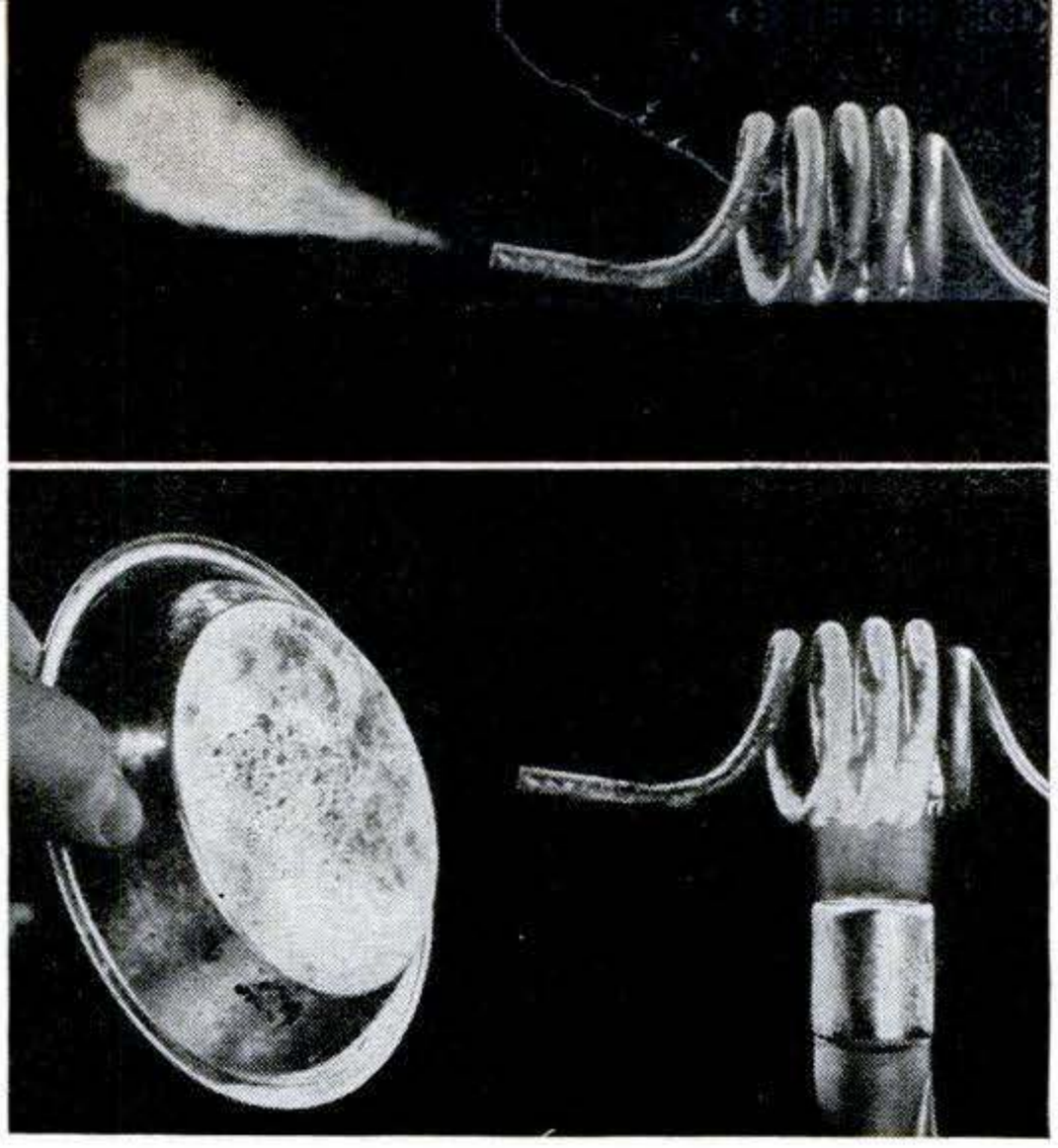
It Ignites Paper and Wood. You may think of steam as being wet, like water, and therefore likely to keep things from burning, but true steam is actually dry. Under conditions of increased pressure or superheating it may be hot enough to ignite wood or paper and melt lead.

Some of the properties of superheated steam may be demonstrated with a home-made superheater coil. Near one end of a 36″ length of ¼″ copper tubing form a coil of four turns 2″ in diameter. Insert the long end of the tubing through a one-hole stopper in a flask containing water, heat the water to boiling, and place a Bunsen burner under the coil. When the coil is heated strongly, the completely invisible steam pouring from the tube will make a piece of wire solder flow like water or, as shown here, will char and even ignite a scrap of paper.

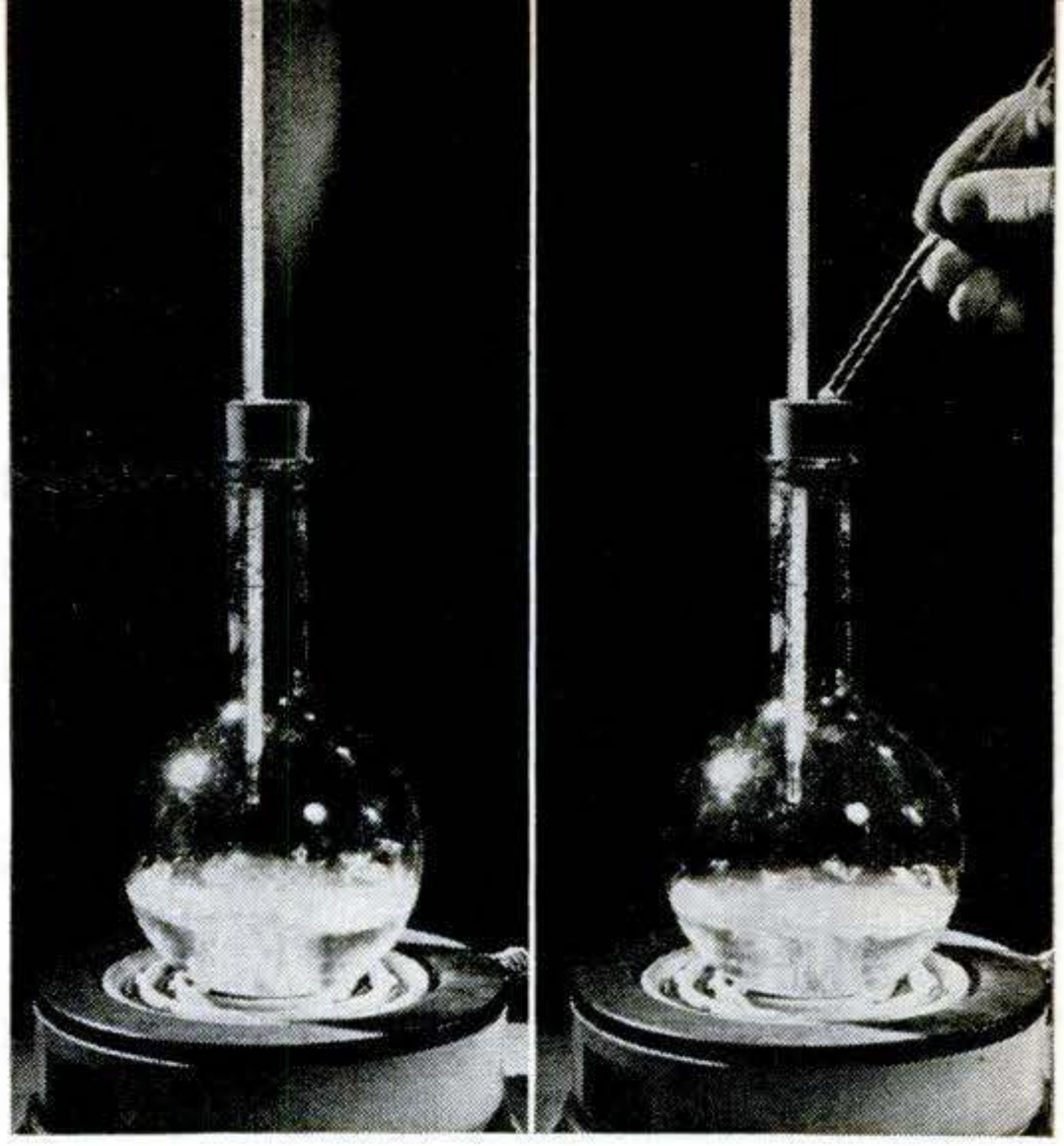


Magnesium Burns in Steam. Magnesium is such an active metal that it can break down steam into oxygen and hydrogen, and burn in that atmosphere. To demonstrate, press a 6″ piece of Pyrex tubing, just slightly larger than the copper tubing, over the nozzle of your superheater and place a 2″ length of magnesium ribbon inside. Then, while boiling the water, heat the coil vigorously and also apply a flame under the magnesium, either using two Bunsen burners or moving one back and forth. The magnesium will soon burn as brilliantly as it would in the open air.

Copyrighted material



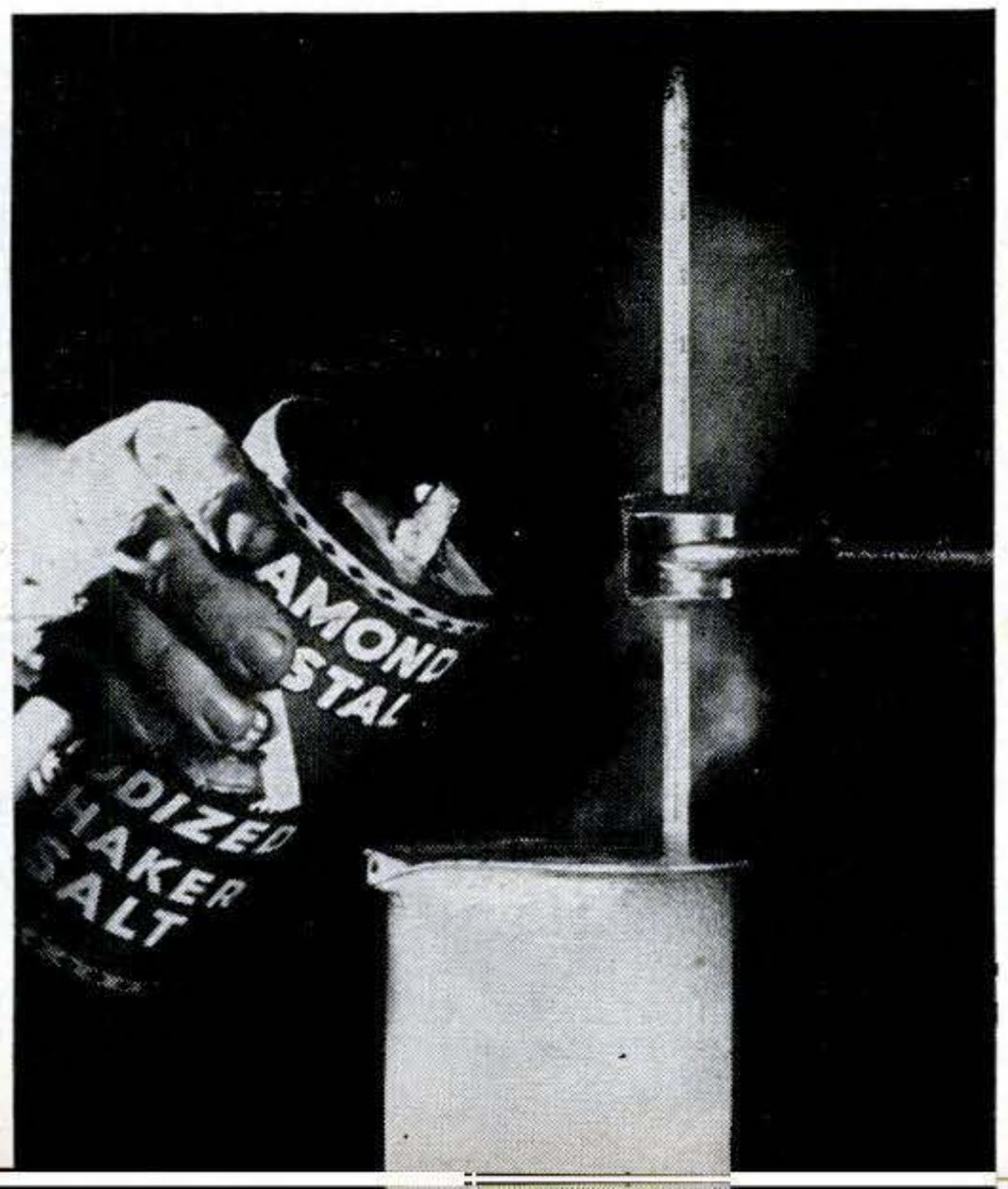
Real Steam Is Invisible. You have never seen real steam, and you never will, for it is completely invisible. The cloud that issues from your coil when it is not heated actually has already condensed into tiny water droplets. But very close to the nozzle the steam is still hot enough to remain gaseous and invisible. Heating the steam in the coil as in the lower photo keeps it gaseous longer, but you can prove it's there—and change it to water—by placing a cool pie plate in its path.

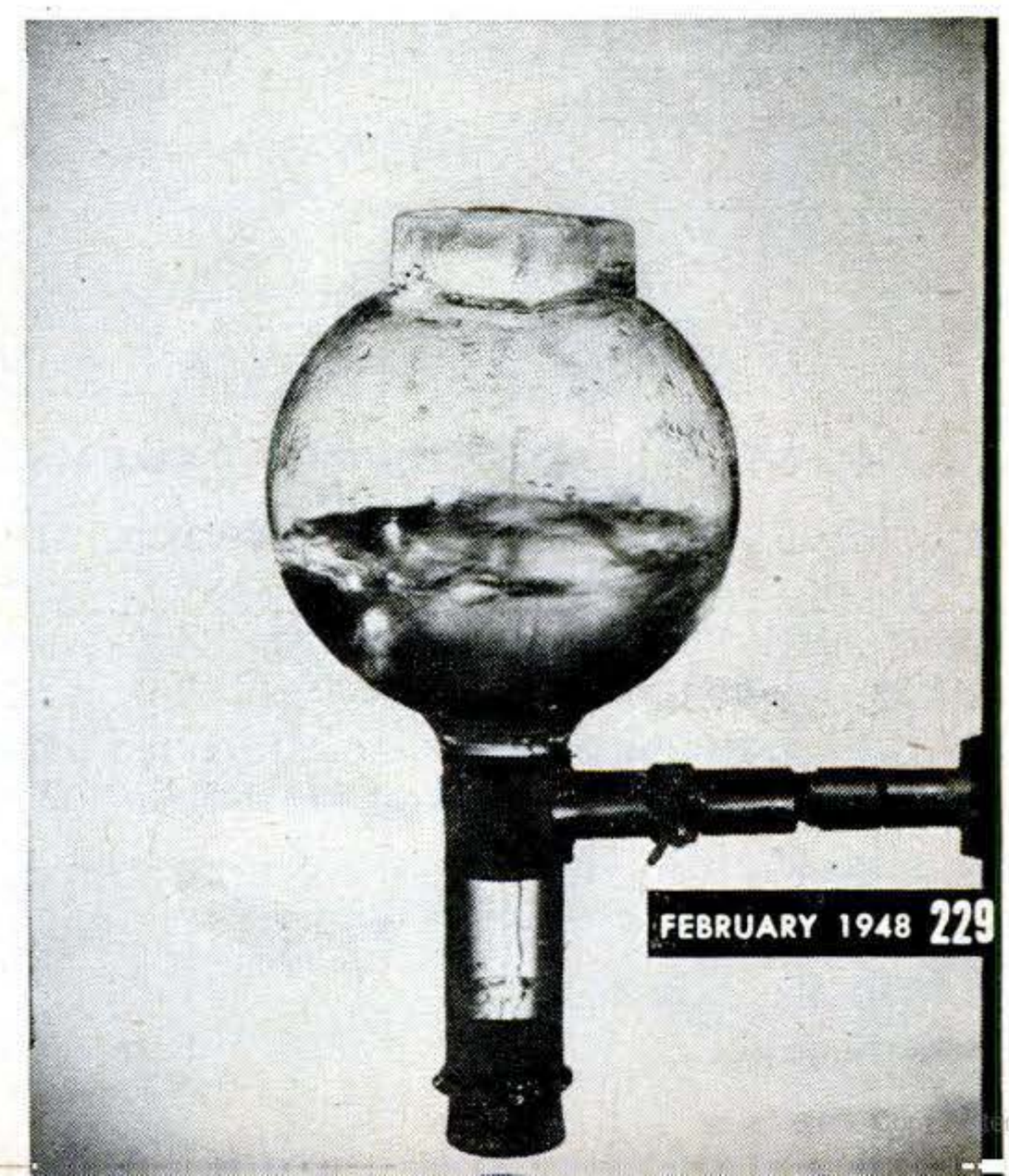


Steam Temperature Varies. The temperature of steam produced in an open pot depends upon atmospheric pressure. If the pressure is increased, the temperature goes up accordingly. This may be demonstrated as above. When water in the flask is boiled rather slowly, a thermometer placed through one hole of a two-hole stopper, as at the left, will register the normal boiling point. If you cautiously close the other hole for just a second or two with a glass rod, the temperature will rise.

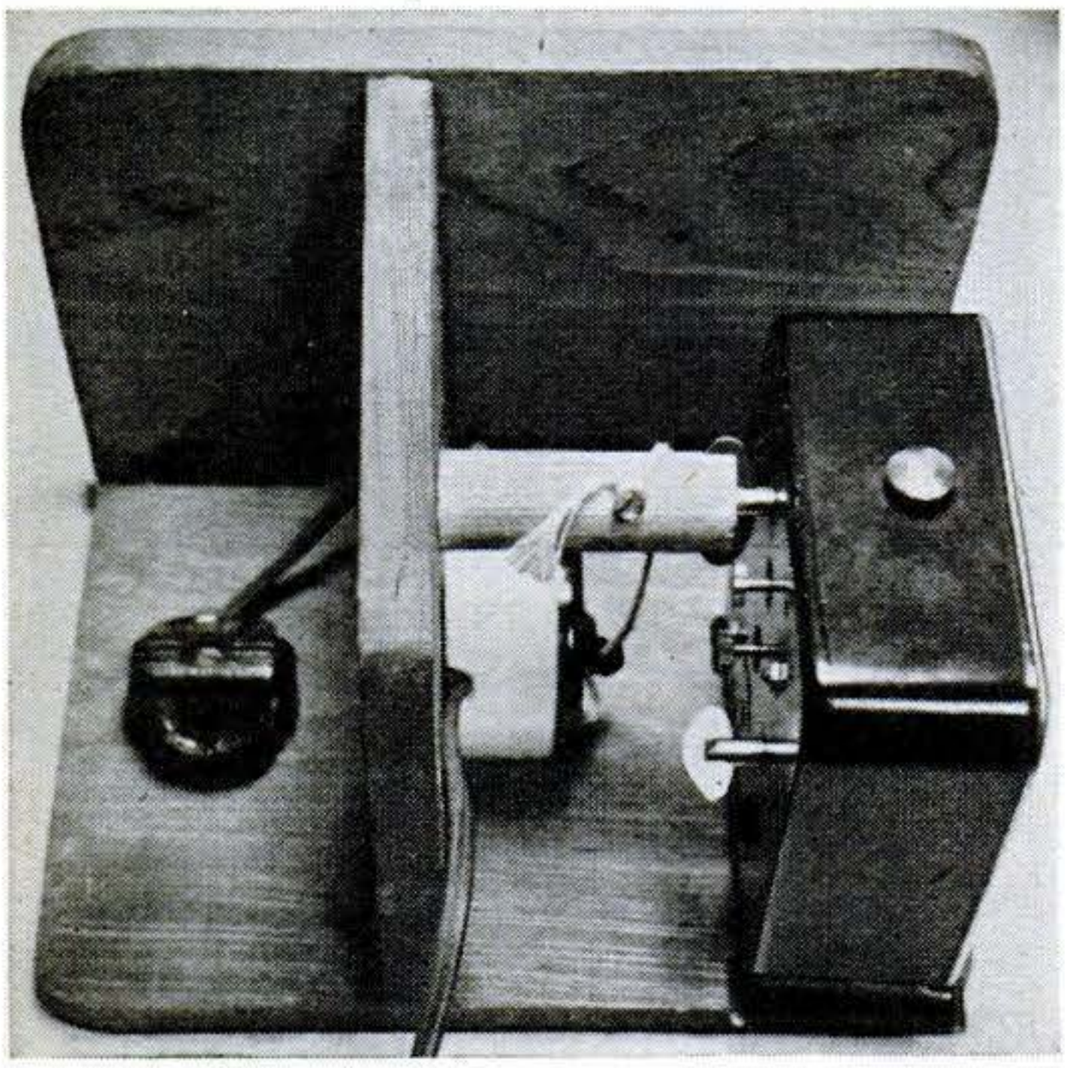
Solids Raise Boiling Point. The temperature of water can be raised above its normal boiling point by dissolving solids in it. Acids and common salt will raise the boiling point even more than such things as glycerin and sugar. You can easily demonstrate this temperature rise, and the differences in the rise caused by different substances, by adding samples to boiling water with a thermometer in it.

Pressure Affects Boiling. How a drop in pressure lowers the boiling point may be demonstrated as below. Half fill a small flask with water, boil it vigorously, remove the heat, and stopper the flask immediately. Then support the flask in an inverted position and place an ice cube on its bottom. By condensing the steam, the ice produces a partial vacuum in the flask. Under the low pressure, the water boils again.





Rotating Dowel Flips Switch When Clock Rings

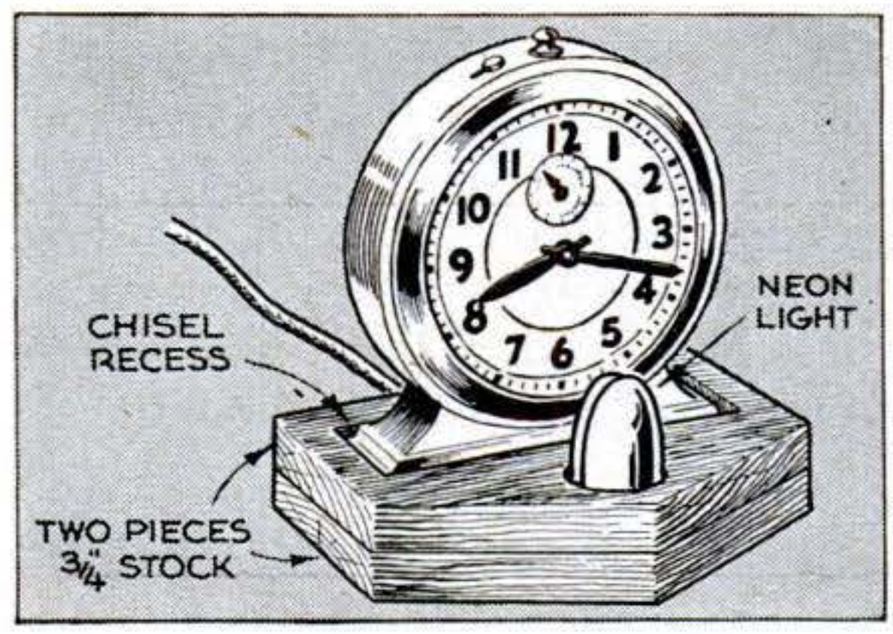


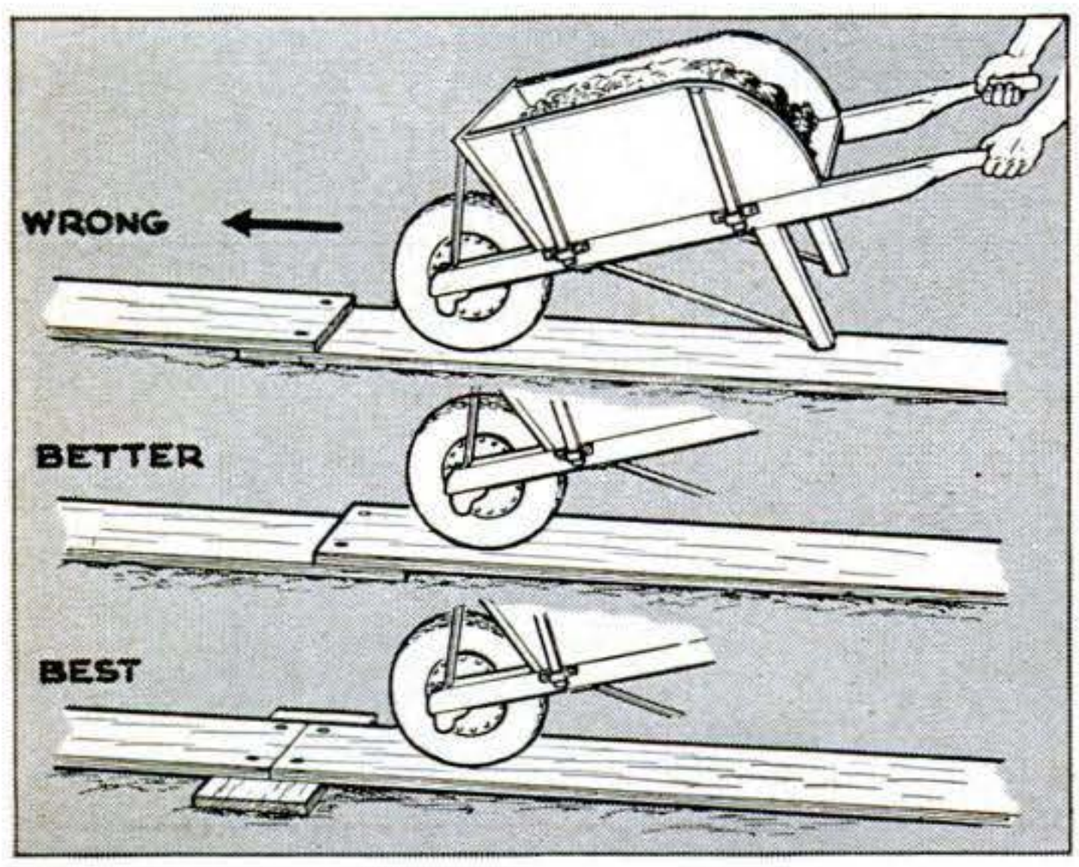
No alteration need be made on the clock used in this time switch, and it is readily removed for use elsewhere. Its only connection is through a slotted dowel that engages the alarm-wind key. A wooden rack may be made to any size that permits the proper relation of switch, rotating dowel, and alarm key. A flush-mounting toggle switch was used, the plastic lever being drilled to receive the wind-up cord.

Slot one end of a ¾" dowel so that the alarm wind fits in freely. Mount the dowel free to turn. I bushed the wooden upright with a piece of copper tubing, inserted a 2½" wood screw as an axle, and turned this tight in the dowel. Even a weak alarm will operate the switch because of the winch effect provided by the dowel.—John Walters.

Neon Light Illuminates Clock Face

Better than a luminous dial, this stand will enable you to tell time without fumbling for a switch. Two 5" by 6" pieces of ¾" wood are cut to the shape shown, a ¼" recess for the clock is chiseled in the top, and a passage for the cord routed in the lower piece. Drill a centered hole for a flush-mounting receptacle. A metal shield is bent over the front of the neon night light, which takes so little current a switch is unnecessary.—Doris Anderson.

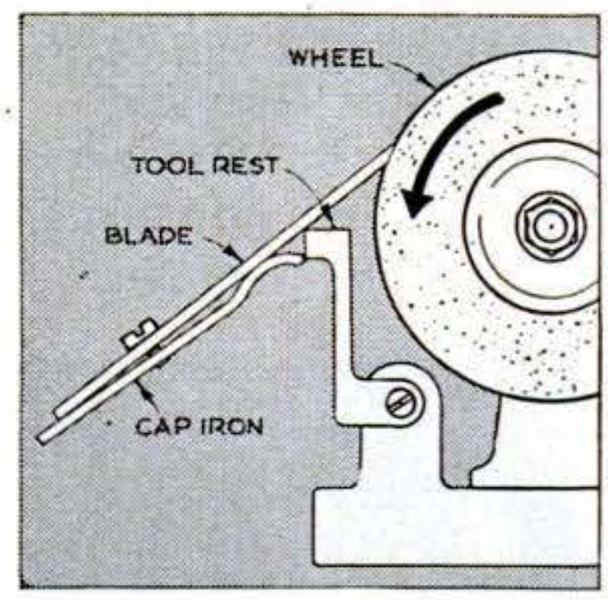




Joining Wheelbarrow Tracks

For pushing a wheelbarrow over soft ground, even for short distances, you'll find that you can move bigger loads faster and easier over boards. Make sure, however, that they are joined properly. If loaded barrows move in one direction only, either the second or third of the illustrated methods is satisfactory.—Hans Schmidbauer.

Cap Iron Sets Grinding Angle

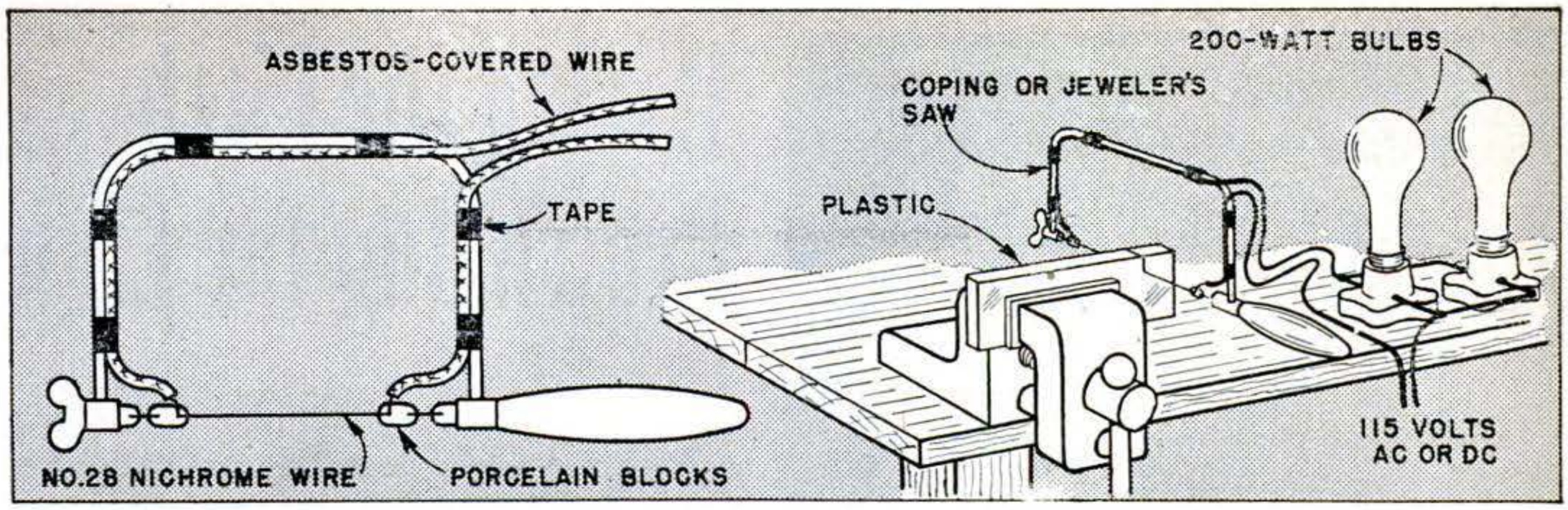


Using a hand grinder, I found it difficult to hold a plane iron steady at the proper 25-deg. angle on the tool rest. By reversing the cap iron and adjusting it until the bevel lies flat on the wheel, however, I can always maintain the position, or regain it after dipping the blade in water.—John Conjurske.

Glue and Water Clean Paint

Animal glue is an excellent woodwork paint cleaner. Mix ½ lb. in 2 qt. water, and let it stand overnight. Boil and stir for ten minutes. Use a cup of it mixed in a small pan of water. Do not rinse off; the size left replaces gloss that washing dims.

Copyrighted material



Thermal "Saw" Melts Its Way Through Plastics

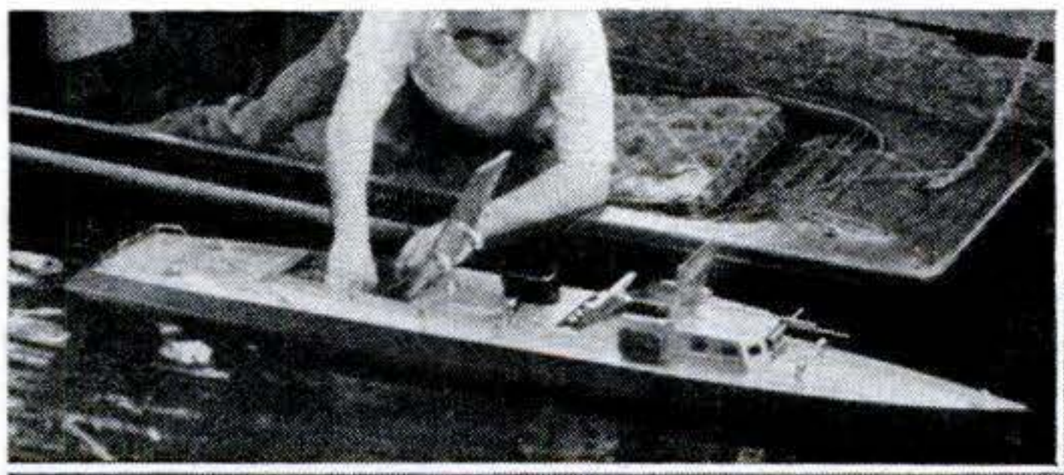
CRAFTSMEN and hobbyists who work in plastic will find use for this saw that gets its muscle from a hot wire. Actually it melts its way through the material, and since it works equally well in any position, curves, circles, and angles may be fashioned more easily than with a blade.

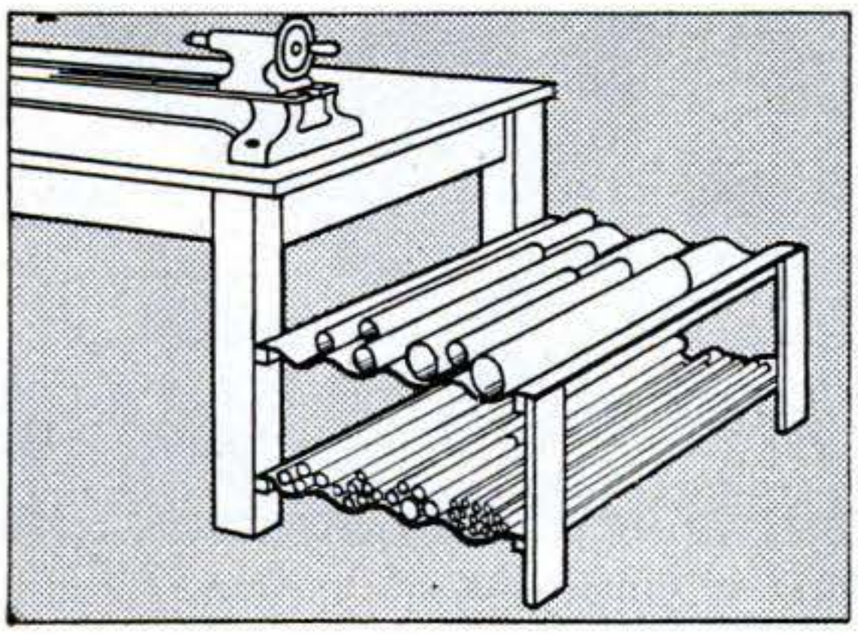
The 6″ of No. 28 resistance wire used in the saw is connected in series with two 200-watt bulbs in parallel. Four 100-watters can be substituted. Other types of resistance wire may also be used, but if changes are made, try various bulbs until you find the combination that cuts well without getting the plastic so hot that it fuses together behind the blade.—STANLEY J. DRAZEK.

Model of Mine Layer Takes People for a Ride

STROLLERS along a towpath that follows England's Thames River occasionally have to look twice before they believe what they see: a punt load of people being hauled by a chuffing model boat. Sprawled in the prow guiding it is its builder, A. E. Squire.

Mr. Squire's 5′ 6″ model of a Royal Navy B-type mine layer has a twin-cylinder, single-acting engine with an overhead slide valve. Its burner is fired with gasoline, and the fuel pump is submerged in the tank. When running under load, the engine will do 3,000 r.p.m., good for about 10 m.p.h. against the current.—A. R. PEERS.





Corrugated Iron Holds Round Stock

SMALL lengths of round stock can create a hazard around the shop if they are just left to kick around or even if they are placed on the flat-racks you use for other materials. By securing a sheet of corrugated iron across the posts of a material rack, however, you can keep them around safely and within easy reach. A smaller piece of the iron should also be set up near the machines on which you most frequently use the stock.—JO RO JUNG.

Copyrighted material

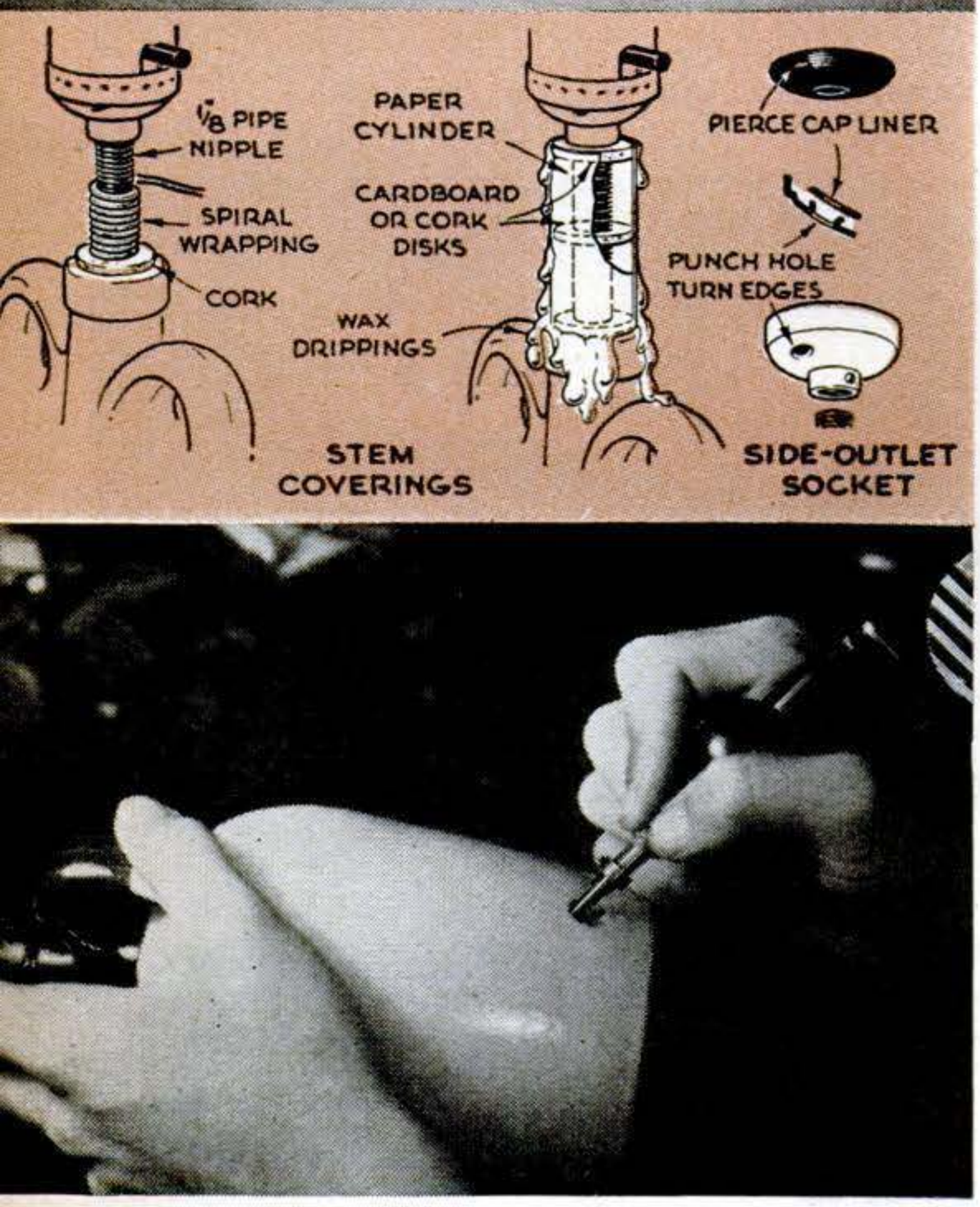
Wiring the Little Brown Jug for Light

ANY decorative jug or bottle may be converted into a lamp base by the procedure outlined here. A hole for the cord may be cut in a pottery jug with an electric engraving tool. Chip the surface gradually from an area ⅜″ in diameter, avoiding heavy pressure. Once a hole is through, nibble the edges to enlarge it. Then insert a rubber grommet.

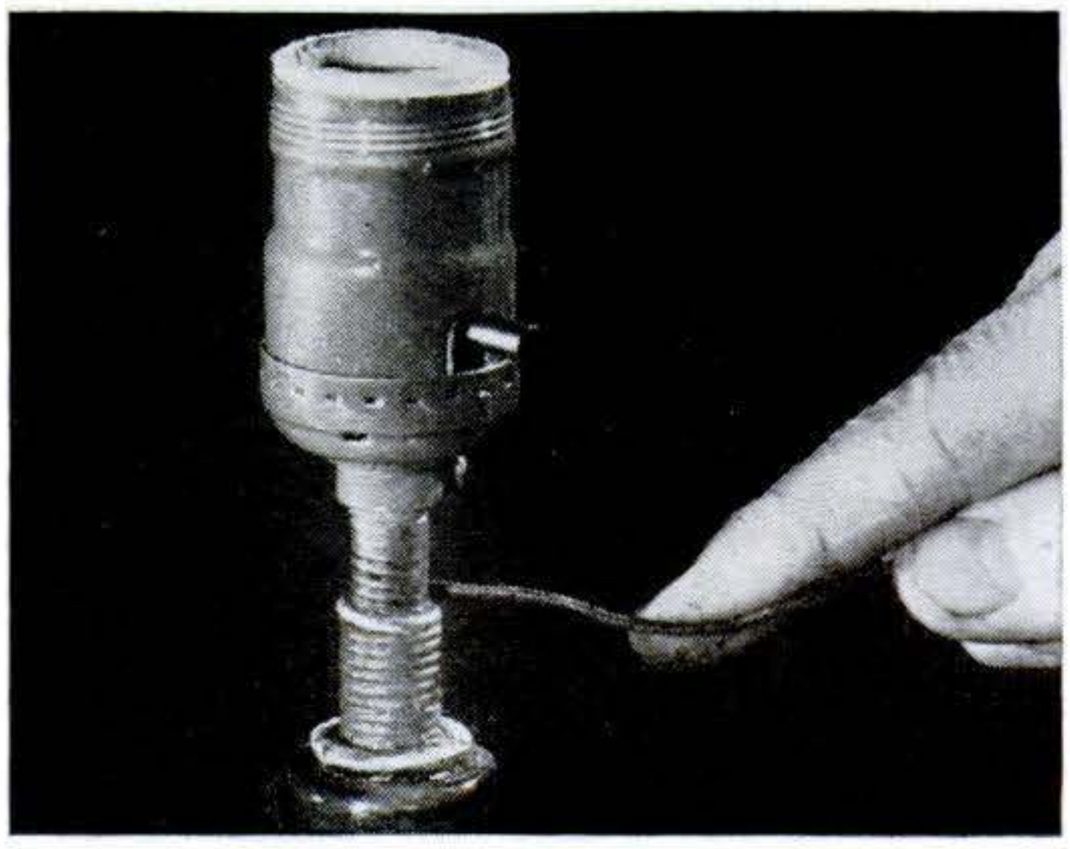
In glass, either drill a hole with a brass or copper tube and abrasive powder (PS, Aug. '47, p. 205) or use a side-outlet socket. If you can't buy such a socket, one can be made by punching a hole in the cap of an ordinary one. Be sure to turn back the sharp edges or make the corresponding hole in the fiber cap a bit smaller to keep the cord from chafing on the metal.

To mount the socket, drill a suitable cork ⅜′ for a ⅛″ pipe nipple 3″ long. Apply household cement generously to the drilled hole, the nipple, the cork, and inside the jug neck. Then, with the cord drawn through both the jug and nipple, press the cork in. Before doing this, however, pour in sand or similar material as necessary to weight the jug.

After a socket has been threaded atop the nipple and the cord leads attached, conceal the nipple by winding heavy cord, raffia, wire, or other material around it. Alternatively, you might simulate a candle as suggested in the drawing.



Slowly does it! While cutting a hole with an engraving tool, chip off the material bit by bit.

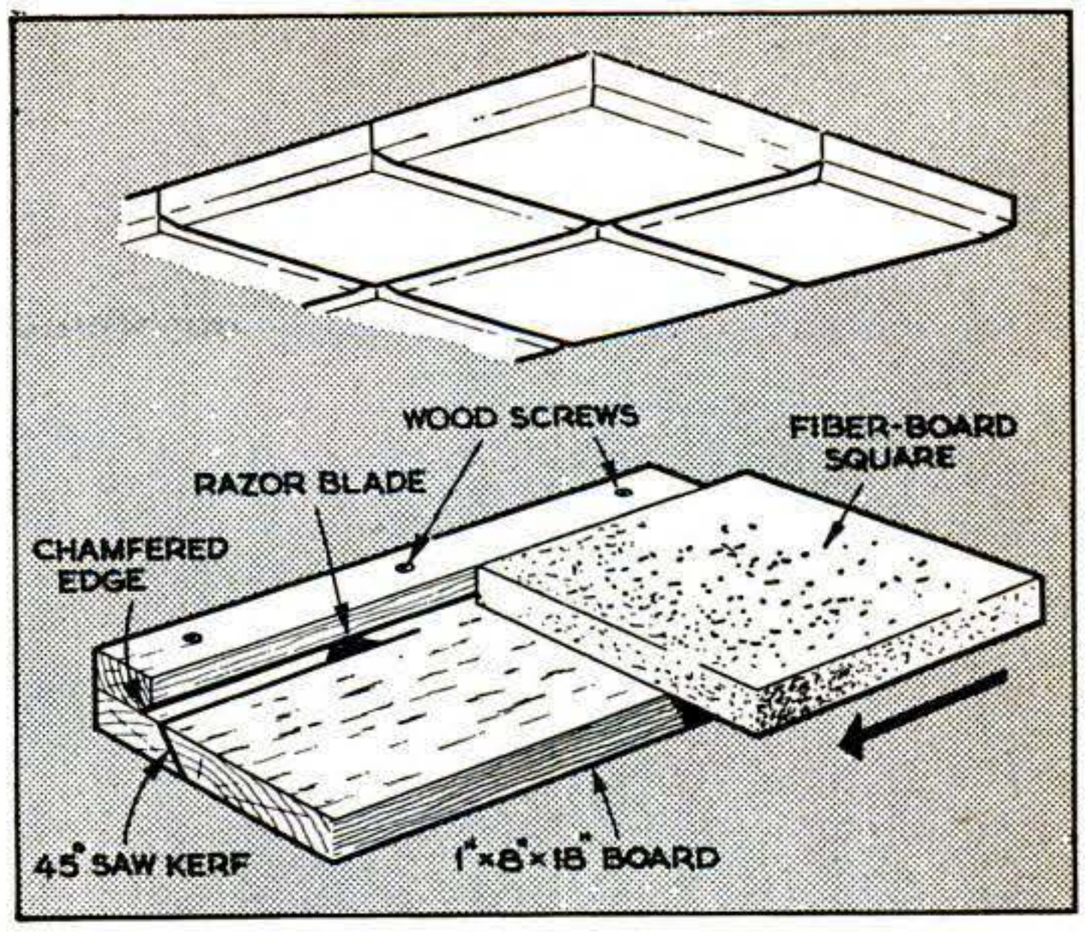


Wind cord or similar material around the pipe nipple, or simulate a candle as in the drawing.

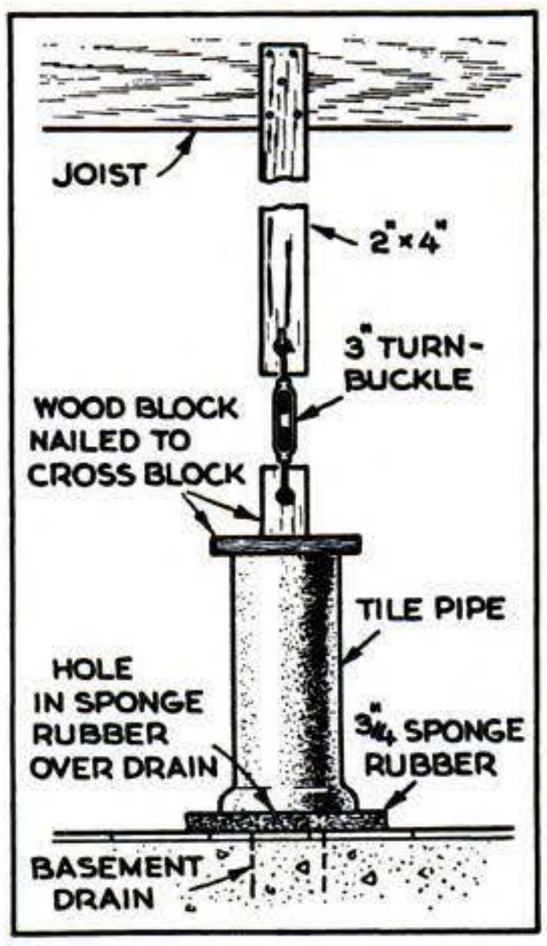
Copyrighted material

Jig Trims Fiber-Board Edges

If you've ever worked with soft fiber board or insulation board, you know how difficult it is to trim the edges neatly, particularly in cutting up squares for finishing a ceiling. With a trimmer made as shown, however, you can get clean, uniform edges comparable to those of commercially made squares. Cutting action is provided by an old razor blade clamped in the 45-deg. saw kerf by means of two wood screws driven in from the rear edge. It should just touch the upper arris of the chamfer. Keep fingers well away from the razor blade when you are pushing work through.

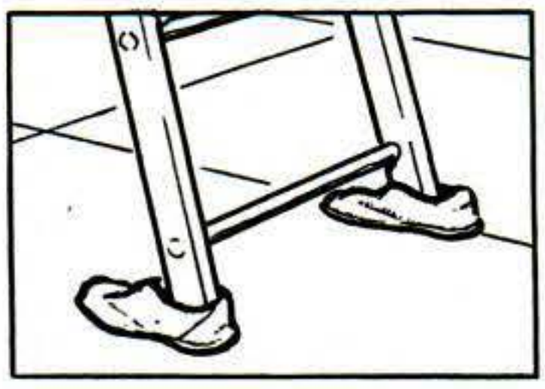


Standpipe Stops Floods

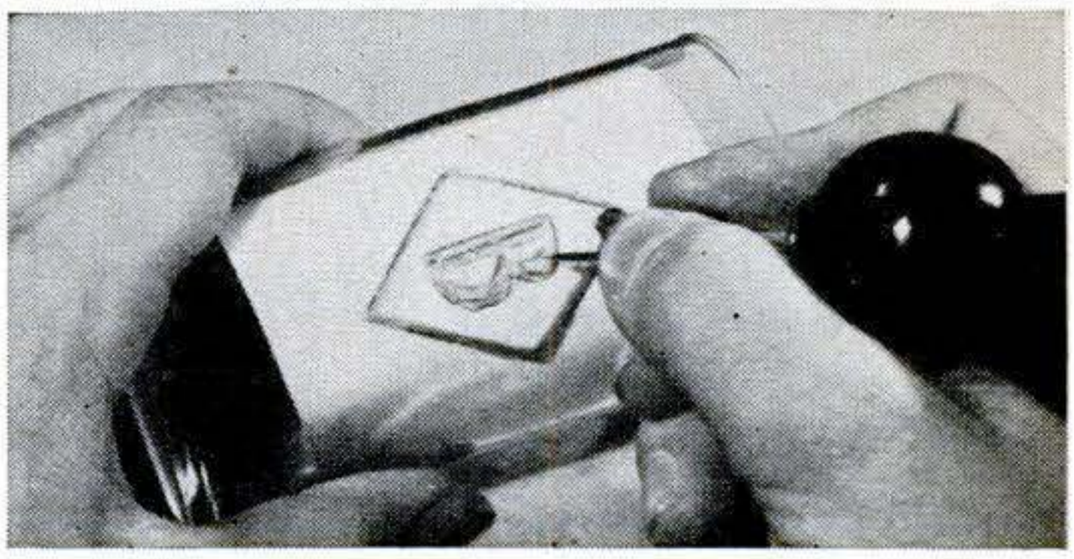


Water backing up in the cellar drain repeatedly flooded my basement until I devised this solution. A piece of sponge rubber with a hole in it is placed over the drain to act as a gasket. On top of this stands a section of tile pipe with a wooden cross block on the top. To this is nailed an upright that is fastened through a turnbuckle to a joist. The turnbuckle is used to apply enough downward pressure for sealing at the floor. When the drain is needed, I unscrew the turnbuckle and lift off the tile and rubber. The upper assembly can be pivoted so that it may be hooked to the ceiling.—W. E. Danneman.

Tennis Shoes Prevent Skidding

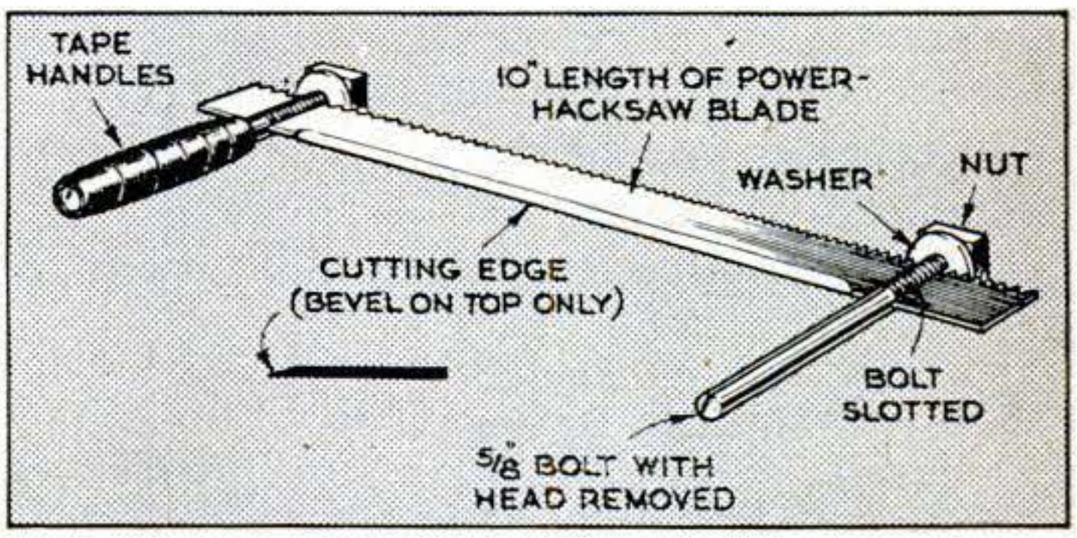


Ladders placed on wet, sloping, or hard surfaces, or on ground that may allow the legs to slide or move, present a serious menace both to the user and to anyone else who may happen to be close by. You'll have far less risk of skidding if you use a pair of worn-out tennis shoes as ladder accessories. Simply plant the ladder inside the shoes for a good grip.—Pat Fey.



Engraving from Single Pattern

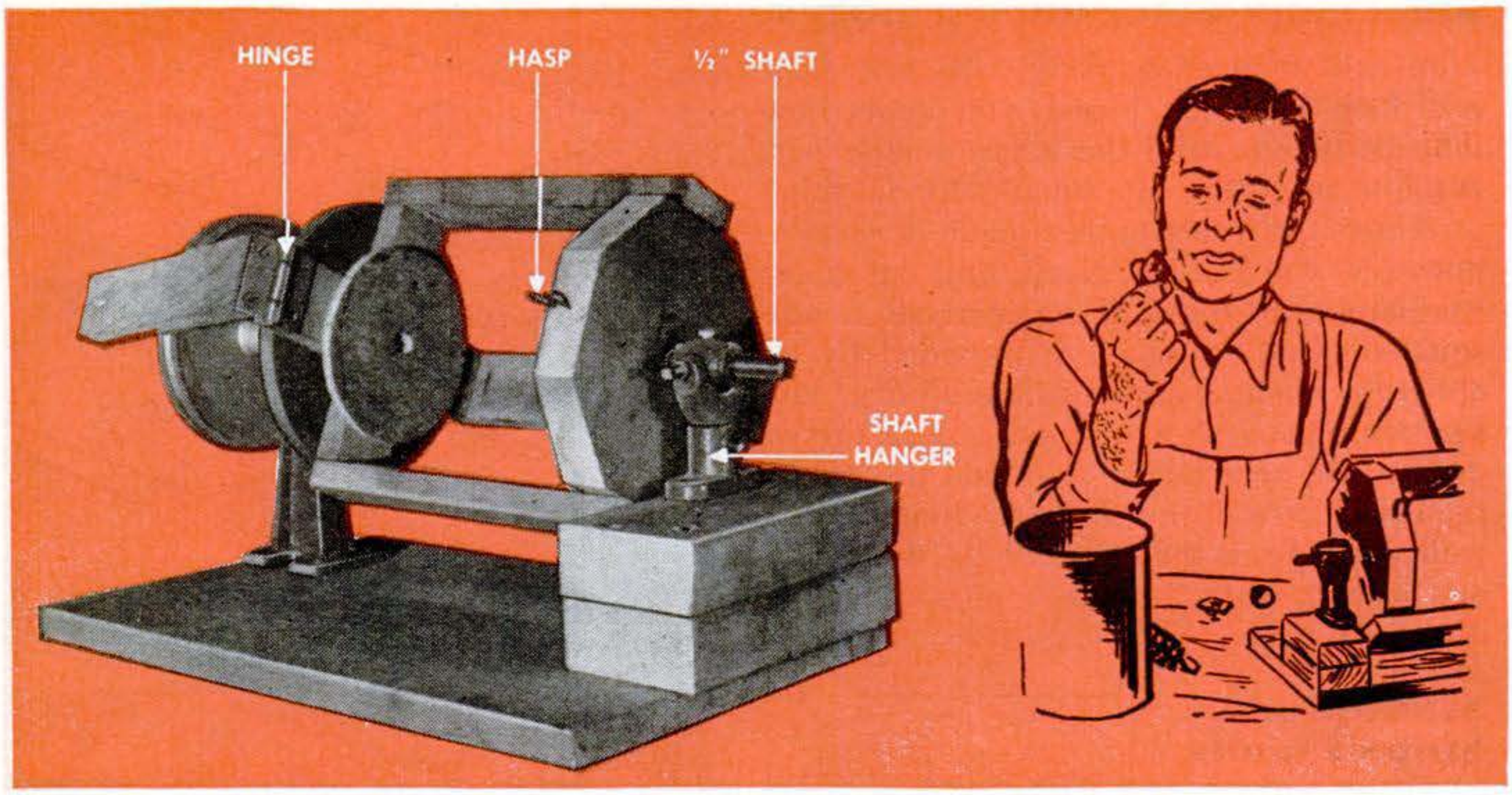
When you want to repeat an engraved pattern on a number of glass articles, the usual method of engraving or grinding right through the paper pattern is undesirable because it destroys the paper. Instead, fasten the pattern inside or under the glass so that it can be transferred unharmed to another piece.—Arthur Beiser.



Saw Blade Used for Draw Knife

One of the handiest woodworking tools, the draw knife, is also one of the hardest to find in the smaller sizes. Two bolts and a broken power-hacksaw blade, however, can solve that problem. Remove the bolt heads and saw slots in the threaded ends. Grind a cutting edge on the back of the blade and secure the ends in the slots with washers and nuts.

Copyrighted material



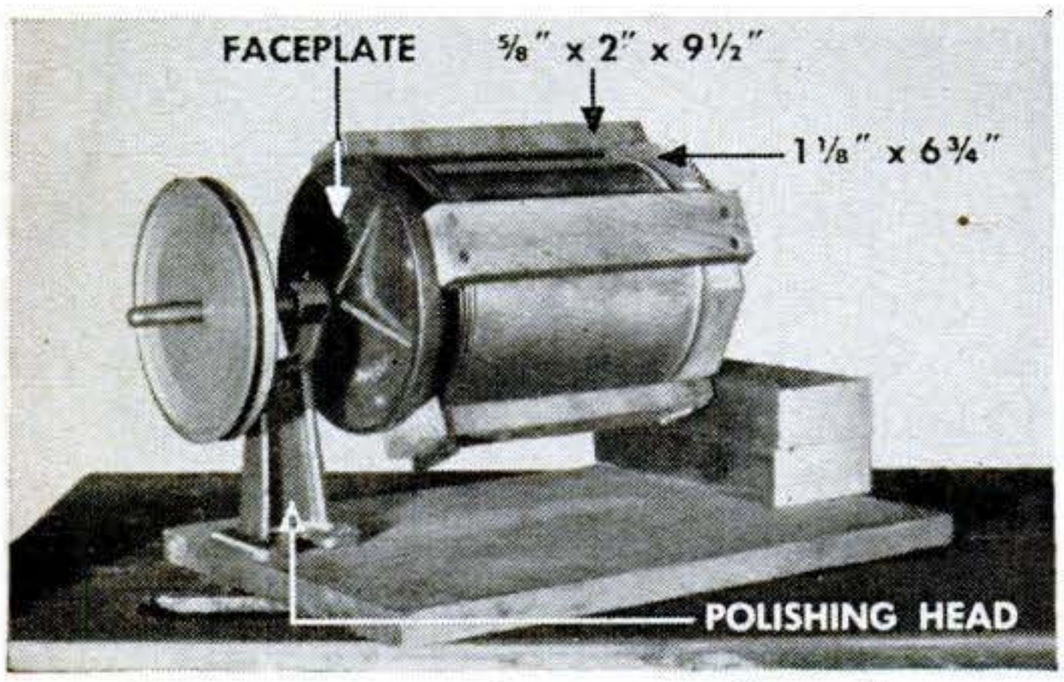
Tumbling Barrel Saves Craftsman's Time

Castings are cleaned, metal parts polished, and paint thoroughly mixed by this simple workshop tumbler.

By Frederic B. Leach

PRECISION tumbling proved its value during the war as a means of deburring and surface-finishing gears, castings, and miscellaneous metal parts—work previously done largely by hand with bench or portable grinders. In the home workshop, a small version of the industrial "rattler" likewise will quickly pay for the effort and time expended in making it.

As its name suggests, a tumbling barrel, or mill, revolves and jumbles together objects and material placed inside the chamber. When this jumbling takes place in the midst of an abrasive medium, the tumbled parts are cleaned or polished with an efficiency difficult to attain by hand.



A gallon can encased in a wood cradle serves as the chamber. Mount the cradle in this way.

Built around a 1-gal. paint can, the mill illustrated here gives good service in cleaning small castings, polishing metal parts, grinding pigments, mixing paint, and various other workshop tasks.

Since paint cans may vary in dimensions, depending on the manufacturer, it is well to have a can on hand before building the wood cradle in which it is slung, for the can must be held firmly while rotating. Attach one end of the cradle to a faceplate by means of two wood strips ⅝" thick and 2" wide half-lapped in the form of a cross having three equal arms and one that is ⅝" longer. Do this by cutting one strip 6¾" long and the other 7⅜". Fit a hinged slat to the long arm and screw three other slats, each measuring ⅝" by 2" by 9½", to the ends of the other cross arms. Fasten a disk of ¼" plywood 5" in diameter to the cross strips for added strength.

An octagonal wood block 1⅛" thick and 6¾" across serves as the other end of the cradle, a brass bushing being fitted in the center to receive a ½" diameter shaft. Screw

Copyrighted material

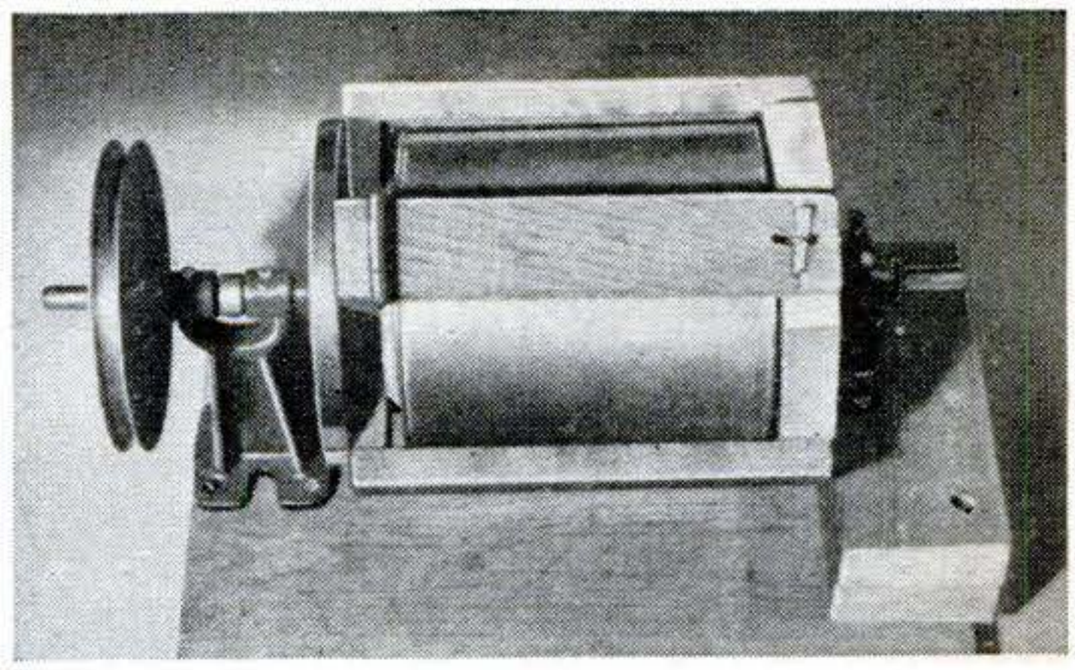
the three stationary slats to this octagon to allow just enough space for the paint can, and install a hasp to hold the hinged slat. This end of the cradle is supported in a bearing that sits on two pieces of two-by-four.

A tumbler must operate at very slow speed or centrifugal force will throw the contents against the walls of the container and eliminate the tumbling effect. Consequently, since the usual workshop motor operates at about 1,750 r.p.m., it is necessary to step down the speed.

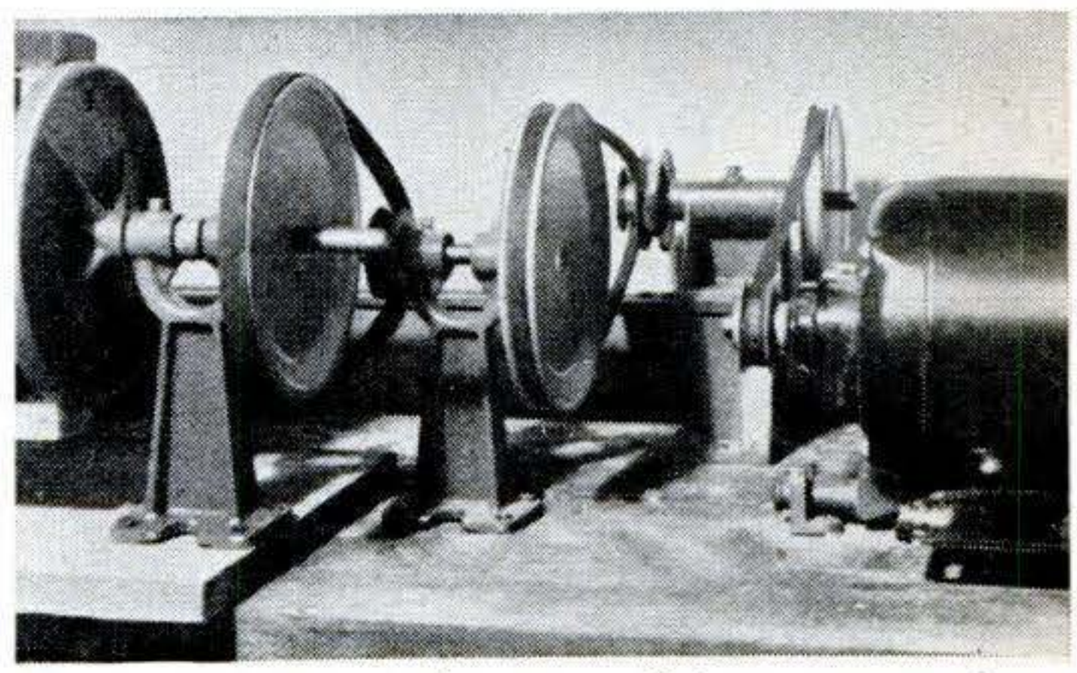
In this case, three steps were used, the pulleys being mounted on a lathe spindle and two polishing heads. In each step, the small pulley is 2″ in diameter; and the larger ones are 5″, 7″, and 6″, respectively. (These were used because they were at hand; three 6″ pulleys would have given about the same effect.) Instead of ½″ V-belts, two of the belts are only ⅜″ wide; hence, they fit closer to the center of the pulleys and increase the ratio. This gives a speed of about 35 r.p.m. Because of the considerable reduction, a motor of quite modest power can be used.

If you find that the tumbled material tends to remain at the bottom of the can, narrow cleats fastened lengthwise inside may overcome the difficulty. Alternatively, you could install an entire inner surface of wood, making it flat sided; or hammer five or six flat areas in the can itself.

Small steel balls will give sufficient abrasive action to clean small castings. Or, instead of balls, you might use stars—small metal objects that look like jacks with which children play. When tumbled together, the castings knock the rough edges off one another and the balls or stars get at the smaller places, loosening any sand and smoothing the casting generally. A mush made of sand and water with a little soap added, or various commercial abrasives, also may be used.



Hinge one slat and fasten it with a hasp to allow insertion and removal of the paint can.

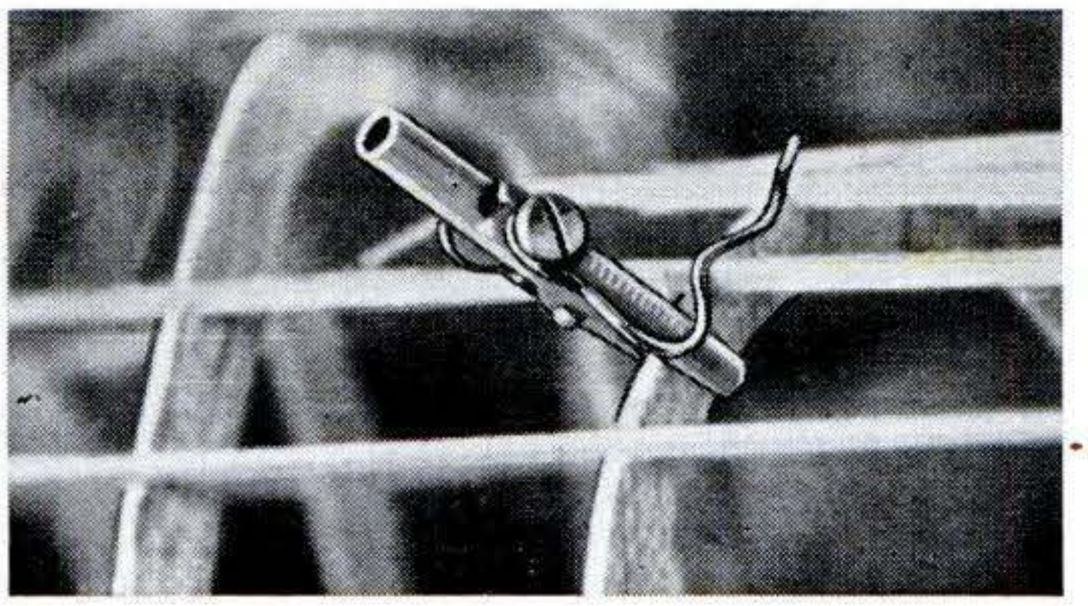


Motor speed must be stepped down. Here, three steps cut the tumbler speed to about 35 r.p.m.

When polishing is desired, various types of materials are suitable. For example, sawdust gives a high luster to some metals. In polishing, however, be careful to follow the instructions of the manufacturer of the polishing material being used, especially when plated metals are involved.

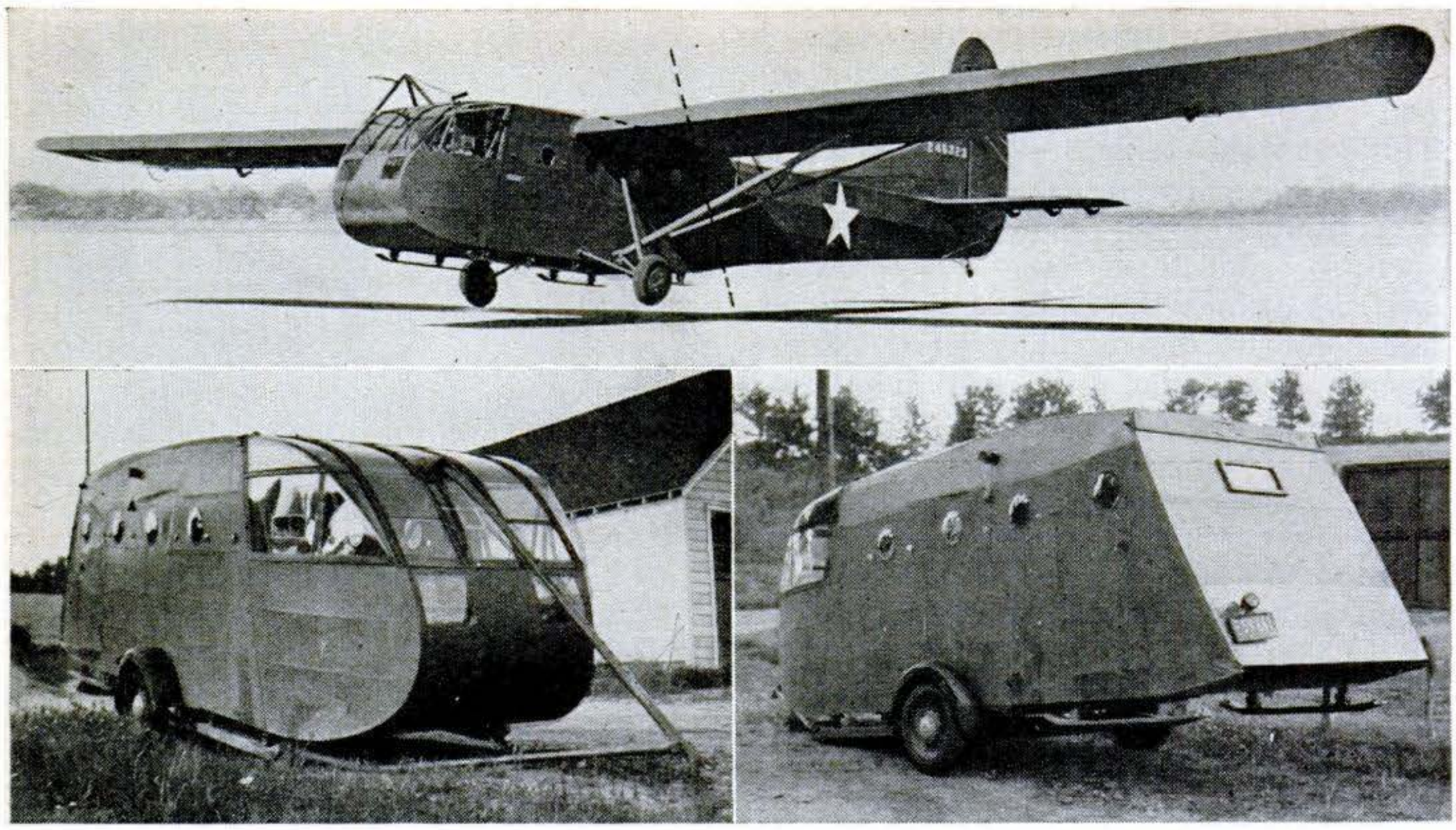
Artists who like to prepare their own materials will find the tumbling mill an excellent means of grinding pigments. In such cases, the material should be placed in the chamber along with a number of steel balls an inch or so in diameter. The continual pounding will grind the pigments very fine—fine enough even for water colors. In fact, the mill will pulverize almost any material that you may wish.

Radio Clips Used as Clamps for Model Building



MODEL builders will find the alligator clips available at radio supply houses extremely useful as miniature clamps. The idea was evolved originally to hold stringers against the bulkhead of a model airplane, as seen here, but the spring jaws might also be used to clamp together adjoining pieces in the conventional manner. A short piece of stiff wire attached to the clip makes it more versatile.—OTTO WOOLLEY.

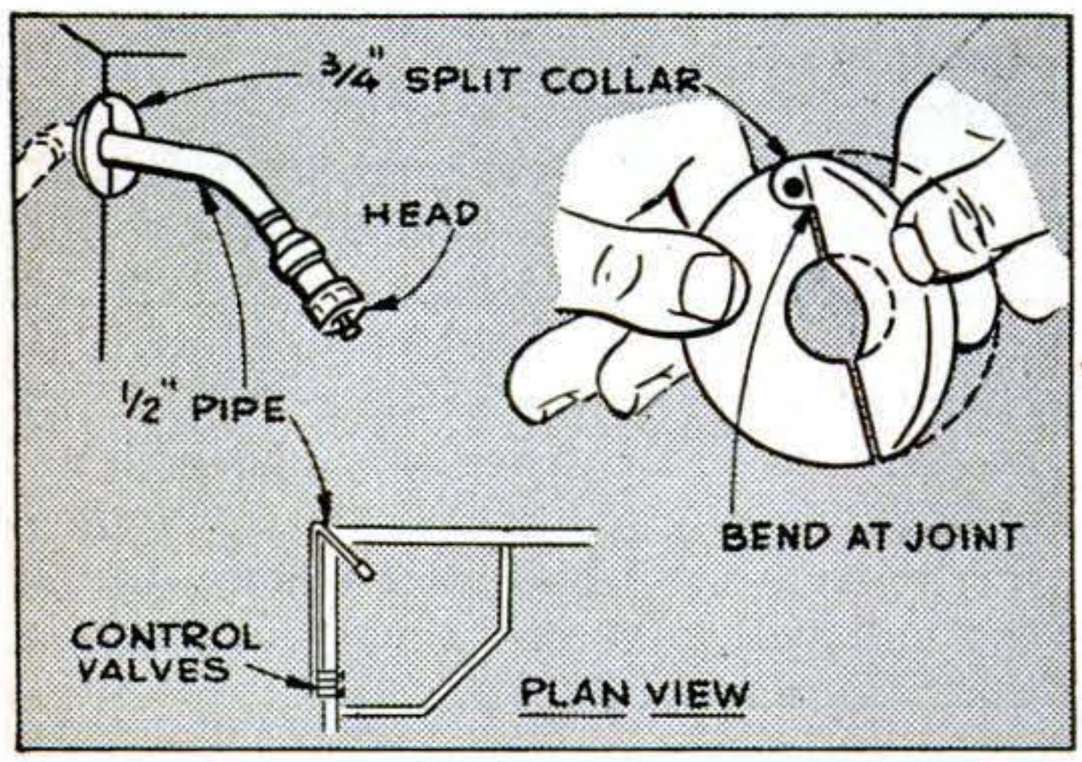
Copyrighted material



Roomy Trailer Built from Troop-Carrying Glider

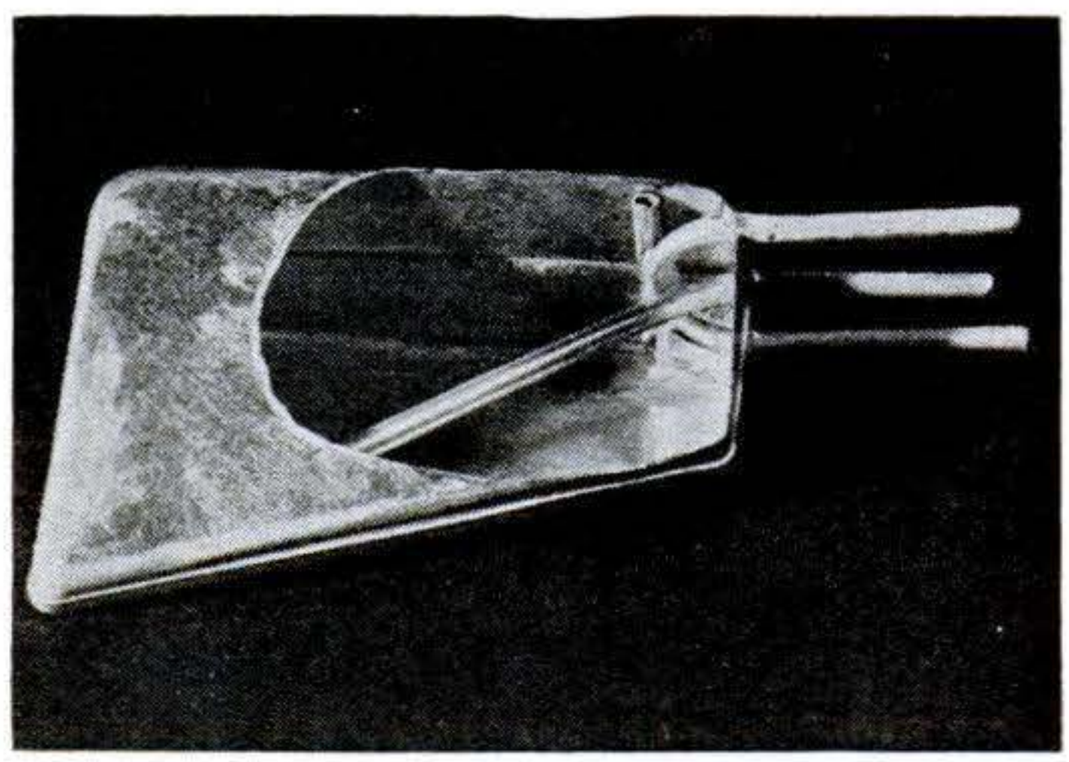
WHILE traveling across country these days you may occasionally spot a trailer that looks like this one. The chances are that it was once in the Army's fleet of troop-carrying gliders, now surplus.

Such gliders offer a head start toward a spacious trailer, for the cabin is 8′ high and 8′ wide. In the case illustrated here, the wings were removed, the fuselage cut off just behind the wings, and a plywood wall installed at the rear. Since the landing gear was too wide for highway use, it was removed. Wheels and fenders were installed at body width. A framework of heavy pipe at the front provides a sturdy hitch.—HENRY CLARK.



Collar Fits Corner Shower

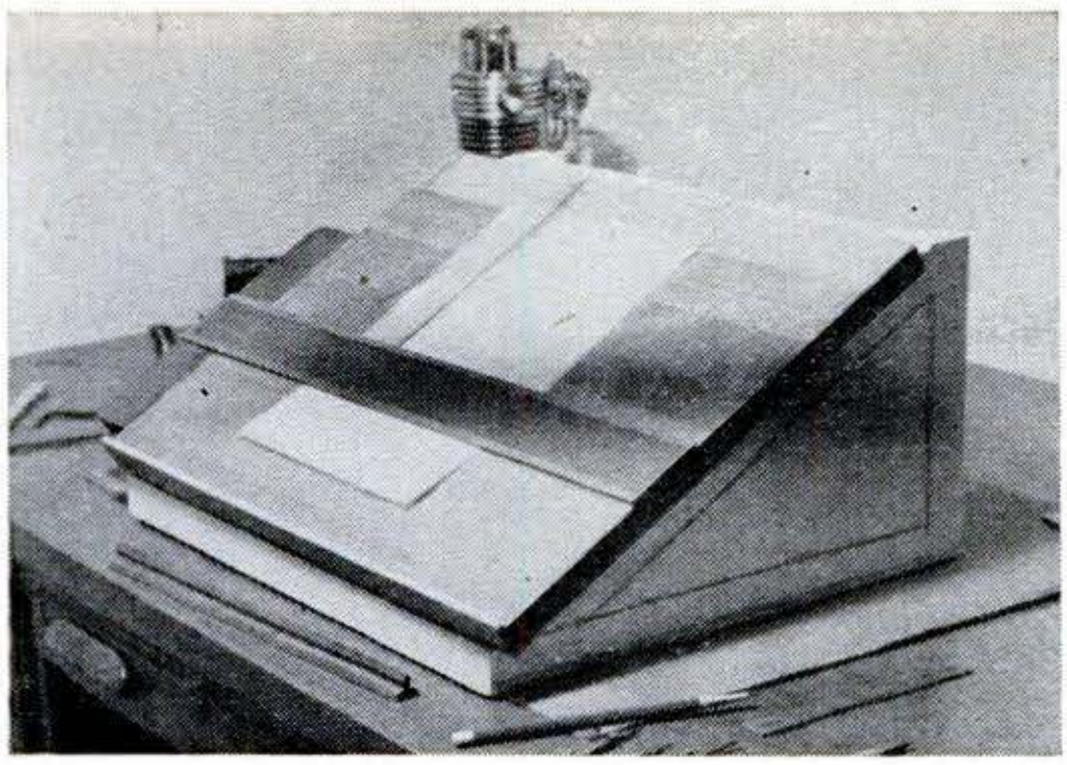
CORNER shower stalls shaped like the one above call for a head projecting from the back corner. A common split collar can be used to finish off such an installation if it is bent near the pivot joint so that the halves form a 90-deg. angle. To compensate for the decrease in size of the hole as the result of bending, an oversize collar must be used, for instance a ¾″ collar on ½″ pipe.—J. MODROCH.

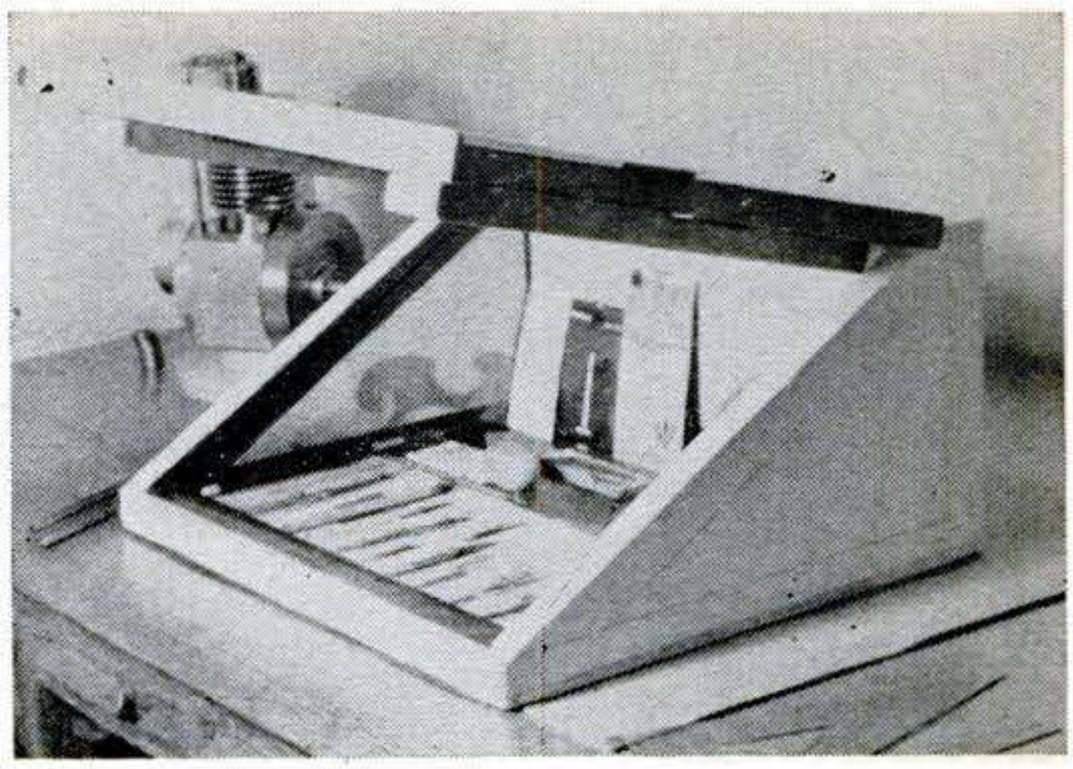


Fuel Tank Feeds to Last Drop

BECAUSE of centrifugal force, the fuel tank in a control-line model plane usually fails to feed the engine when the supply gets low, but here's a tank that overcomes this problem. As seen in the cutaway view above, the feeder line runs to the outer end of the trailing edge. Either of the two vent tubes may be used for filling. Made of aluminum, the tank was developed by Westchester Hobbies, Inc., White Plains, N. Y.

Copyrighted material





Drawing-Board Cabinet Houses Drafting Tools

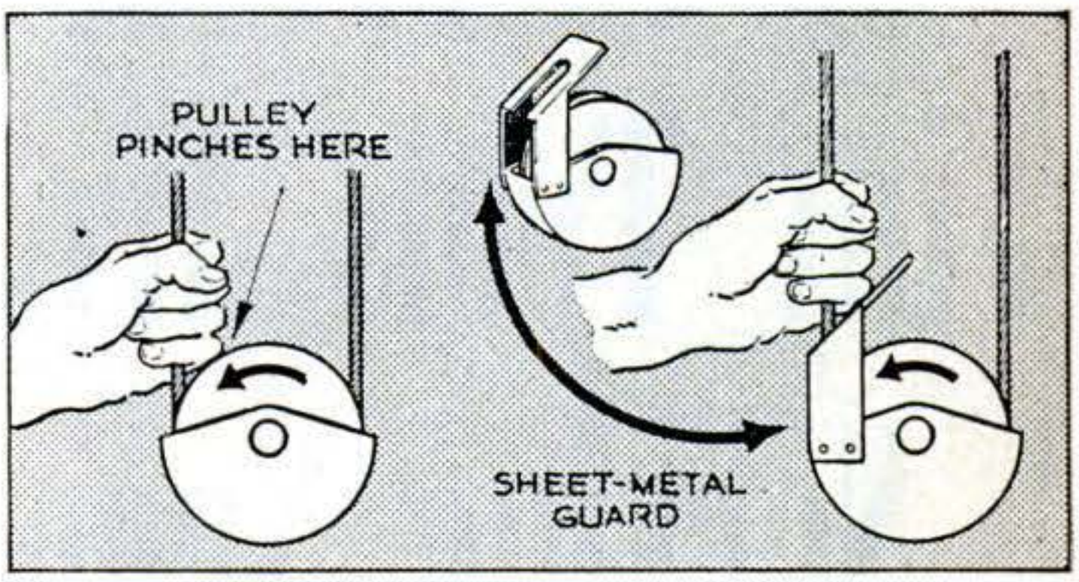
When occasional drawing is done in a home or office, the needed items often have to be found one by one. Here's a cabinet that keeps them together and also provides a sloping support for the drawing board.

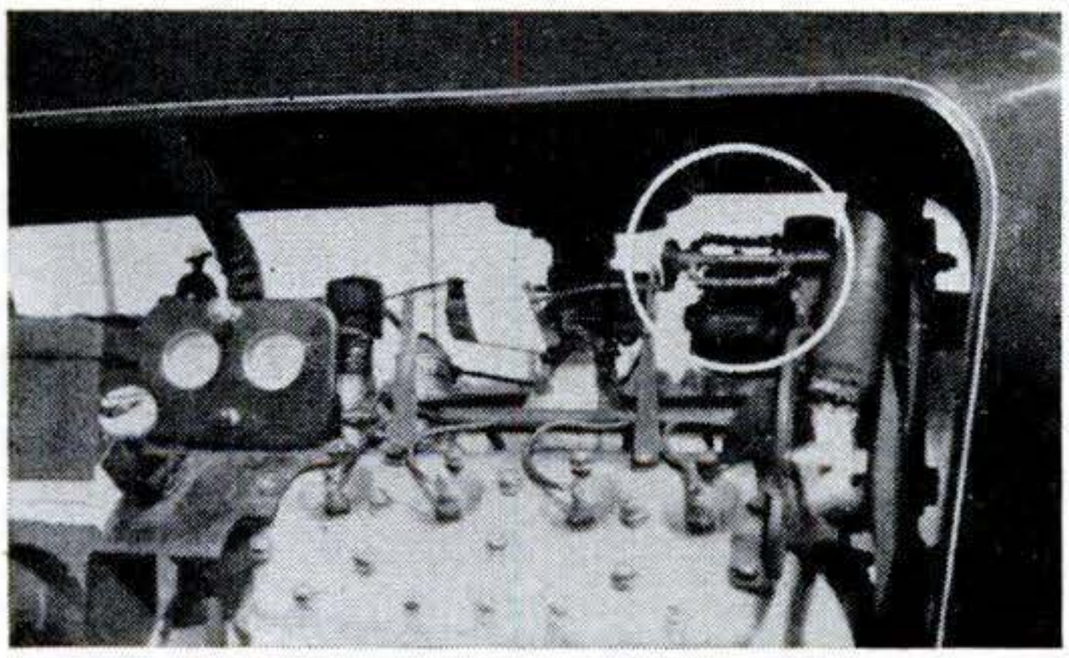
Triangular endpieces position the board, which is hinged and serves as a lid. The hinges are screwed to a small shelf that's handy for holding instruments during work. A ledge on the bottom of the board keeps T-square and triangles from falling off.

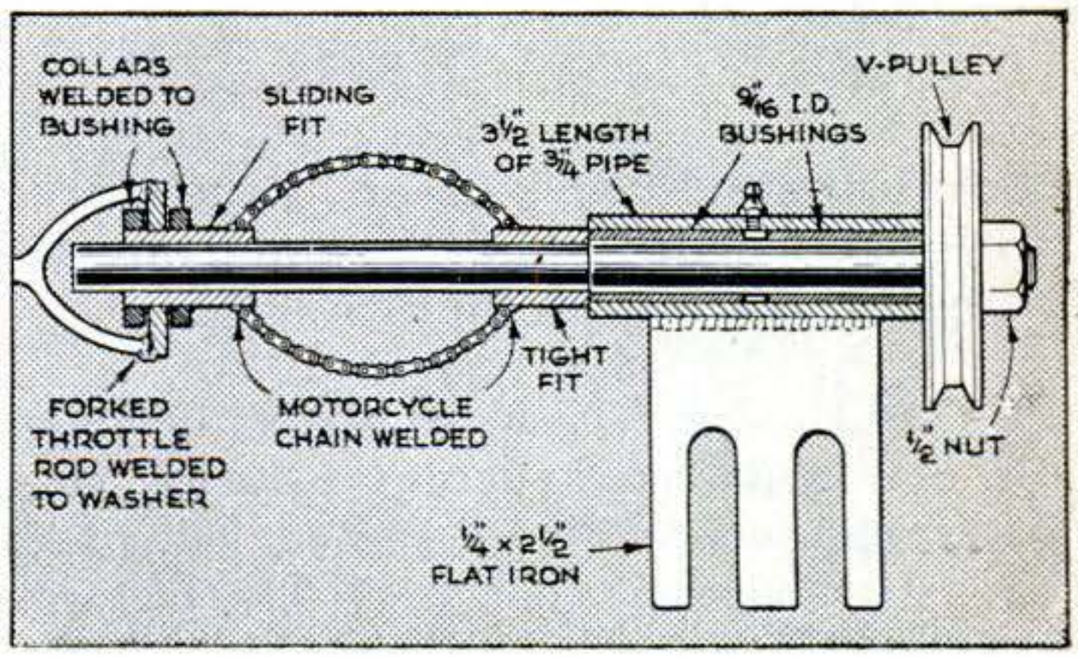
If you have a fitted case for your instruments, it can be fastened directly to the bottom of the cabinet, leaving plenty of room for triangles, scales, and other accessories. A paper rack might be mounted on the underside of the drawing board. If the room isn't well lighted, a bracket or gooseneck lamp can be affixed to the back or side of the cabinet.—J. C. Magee.

Shield Is Safeguard on Pulley

It's all too easy to pinch a hand or finger in a rope pulley, especially if one has to watch something else. A slotted guard made of heavy sheet metal will prevent such injuries. It's a Y-shaped piece, with the leg slotted down from the crotch, and the arms bent back and riveted or screwed to the pulley housing.—Hans Schmidbauer.



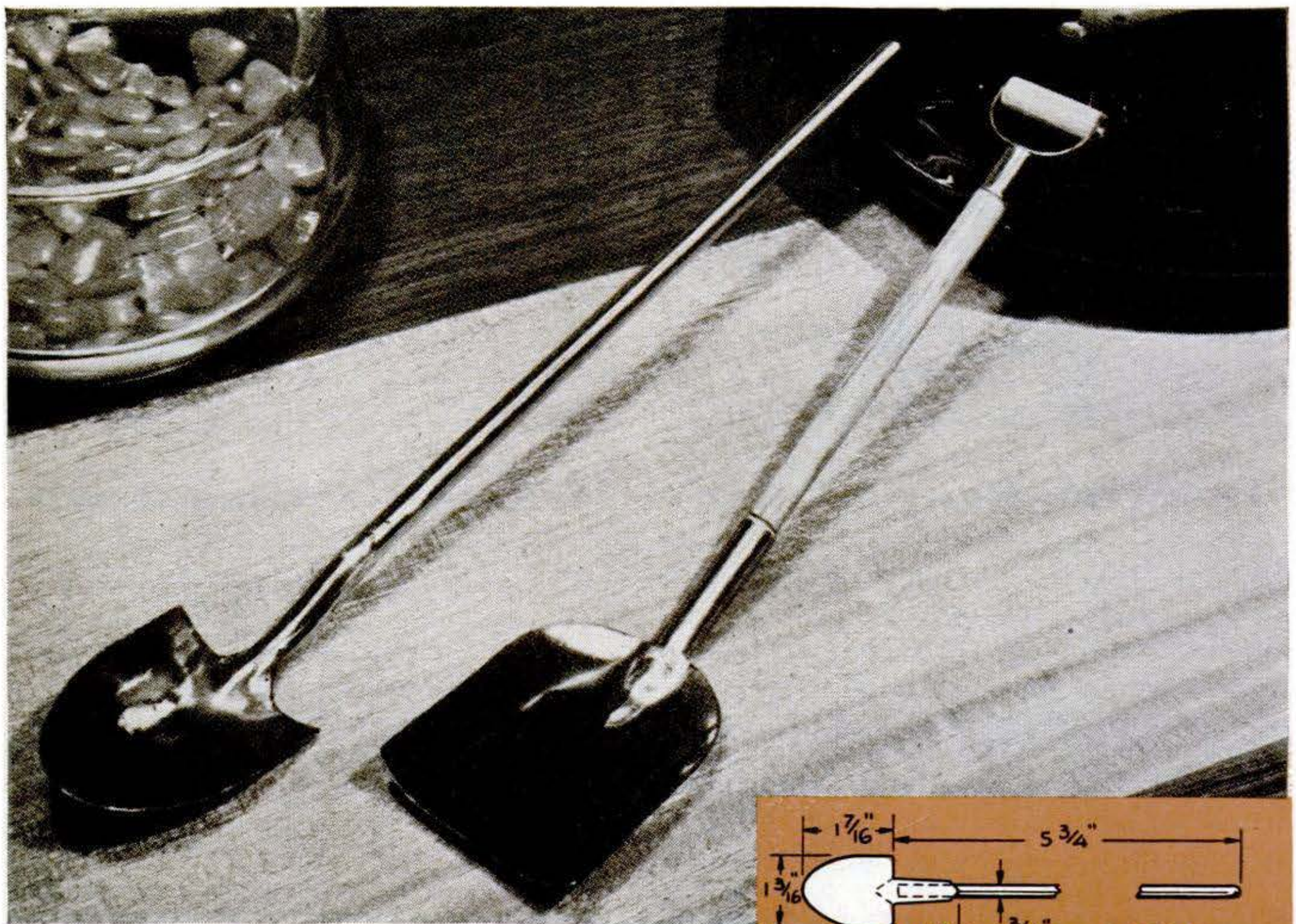


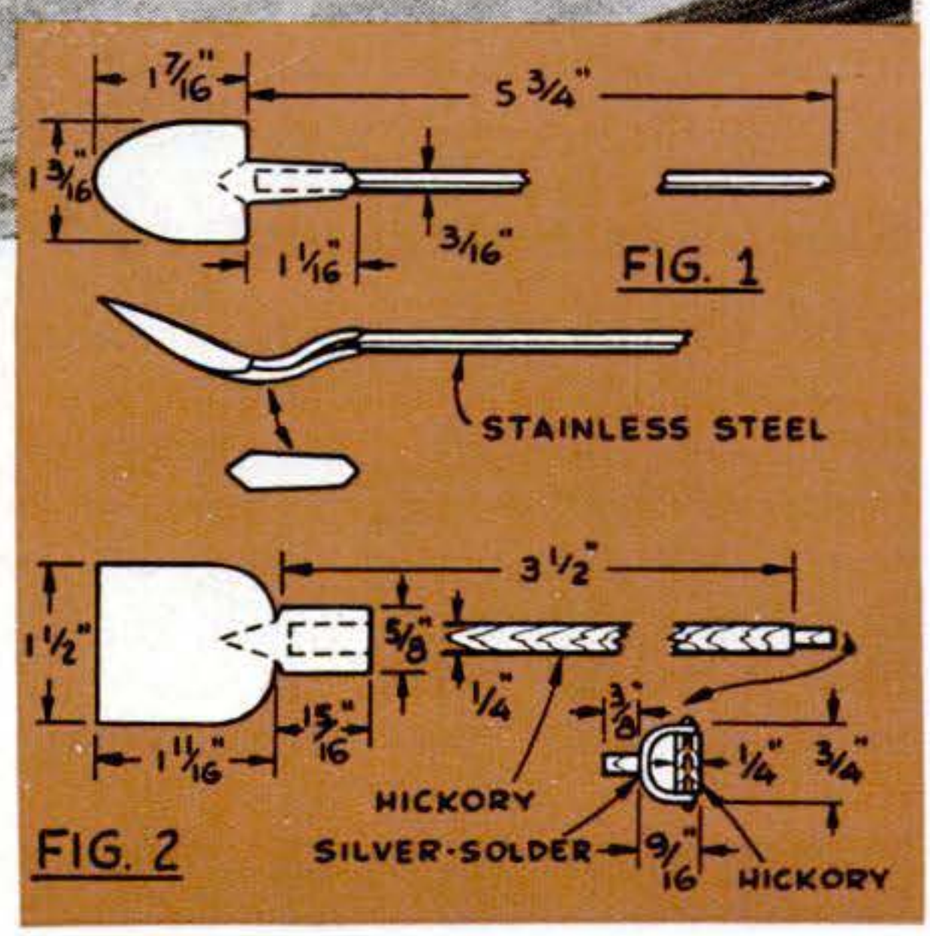


Chain Gives Fly-Ball Action on Engine Governor

Short lengths of motorcycle chain are the fly balls of an engine governor built by Arvid Kotanen, of Port Arthur, Can., as reported by The Hobart Brothers Company. Made to control a gasoline-powered welding generator, it consists of a pulley-driven shaft having a tight sleeve near the bearing and a loose one outboard. The chain lengths are welded to the two sleeves, and as they are bowed outward by centrifugal force draw the free-running one inward. Two washers welded to this have between them a free washer to which the throttle is attached. The bearing is a bushed length of ¾" pipe.

Copyrighted material





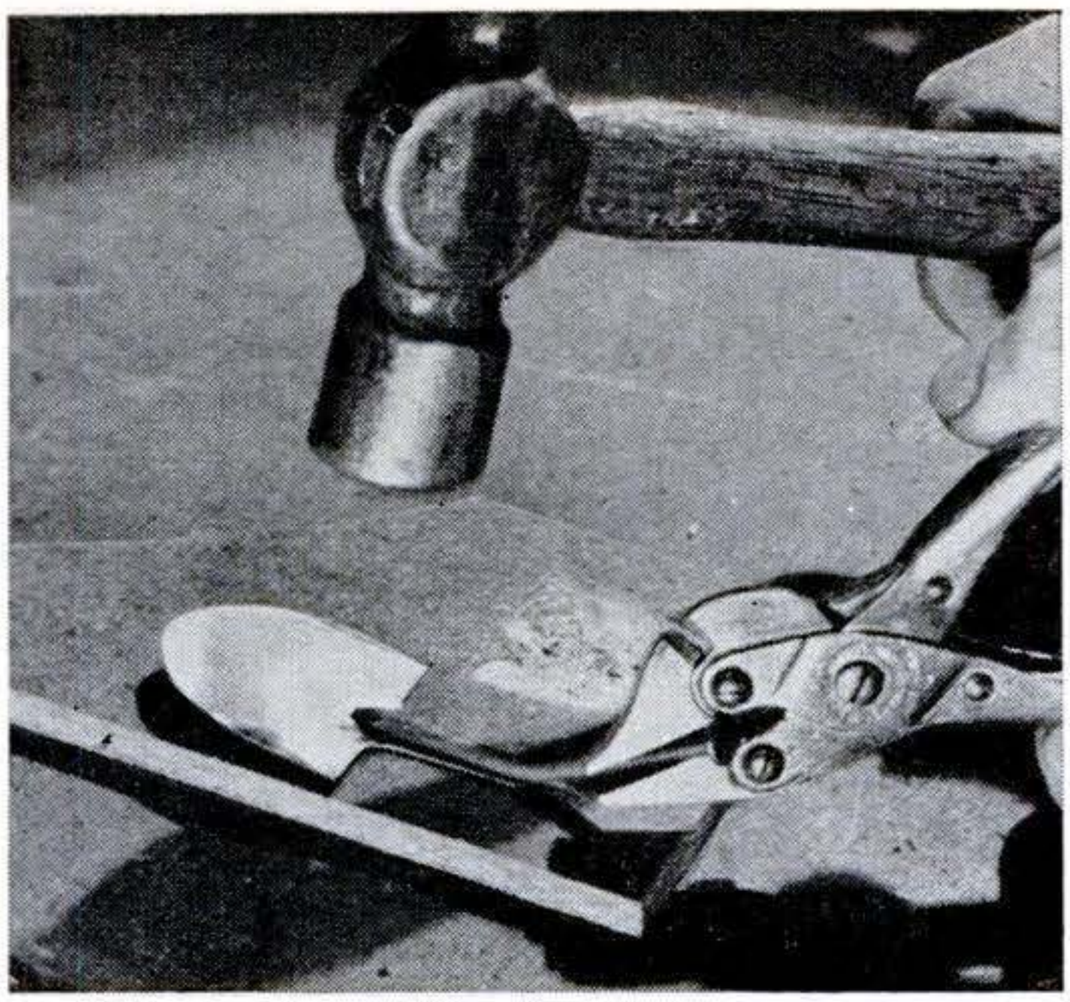
Tiny Tools Are Serving Spoons

Stainless-steel or silver miniatures will scoop up sugar, salt, candies, nuts, or other table delicacies.

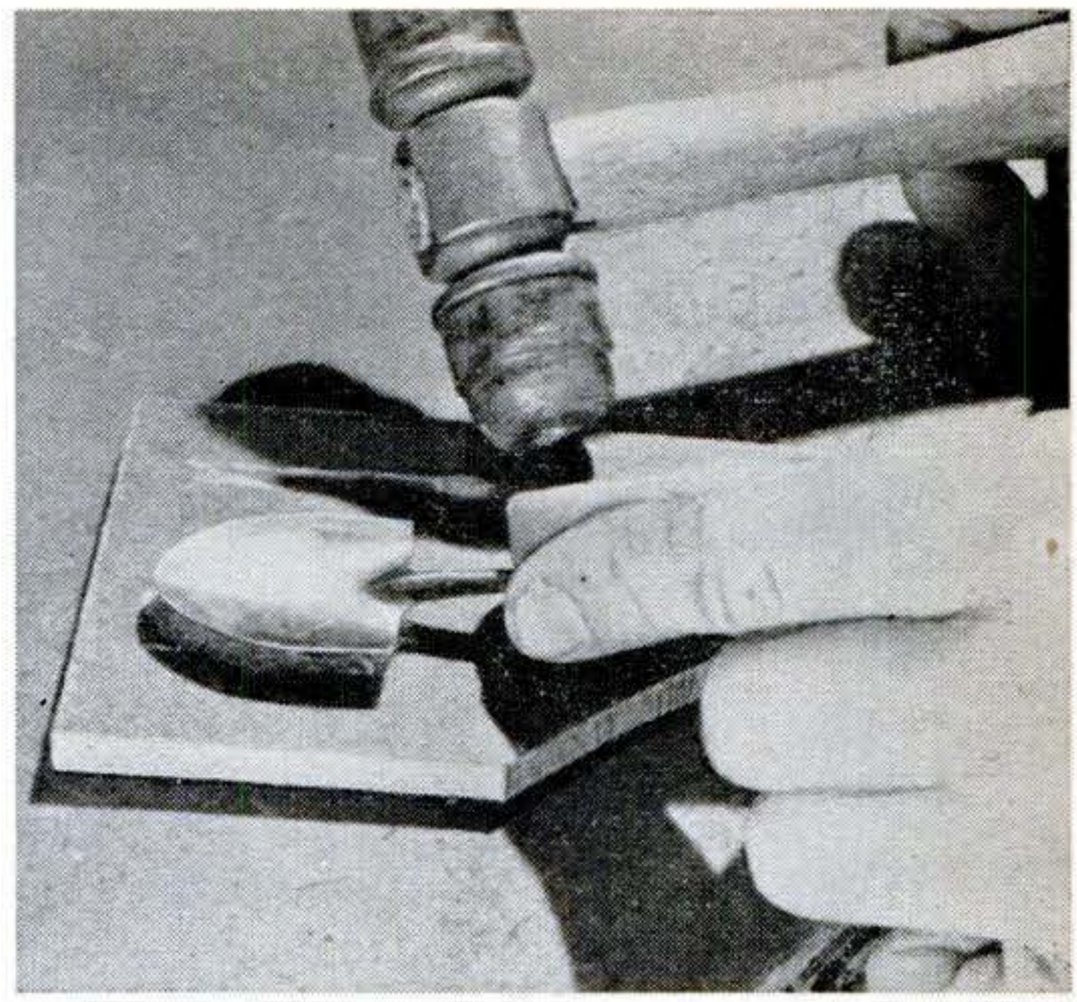
TABLE shovels are attractive novelties that invite lazy appetites to sample your party offerings. Both a long-handled shovel and short-handled coal scoop are pictured here, but there is no need to stop with this pair. Scaled ⅛″ to the inch, any garden implement may model for your tableware. Individual salt shovels need be only about half this scale.

Stainless steel, sheet silver, aluminum, or similar material can be used provided the gauge is not too heavy. The long shovel is made as shown in Fig. 1. Cut the blade and the upper half of the handle socket in one piece. To shape the projecting shank so it will fit around the handle, rout a groove in a piece of composition board or fiber. Align the metal shank and a nail over the groove and strike the nail with a hammer. The groove should be about 7/32″ in diameter and the nail about 5/32″. Let the tip of the nail project into the blade area enough to form a slight depression there. Using the nail as a core, finish forming the shank, then bend it to the shape shown in the side view. Cut out a hollow of the proper contour in the composition board, turn the blade blank around, and hammer it into its concave shape with a round-nosed plastic hammer. Another method is to place a few layers of inner-tube rubber over the metal and shape it with a ball-peen hammer.

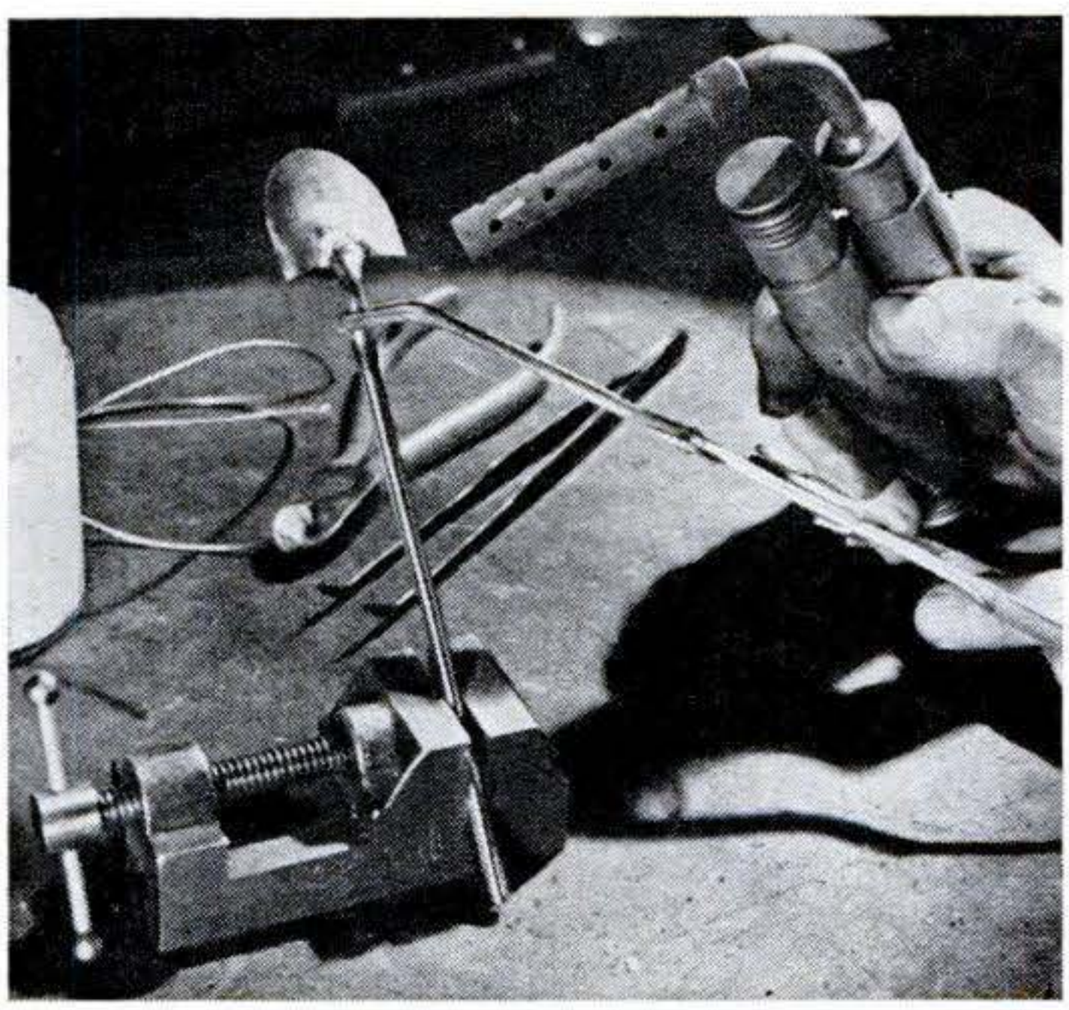
Copyrighted material



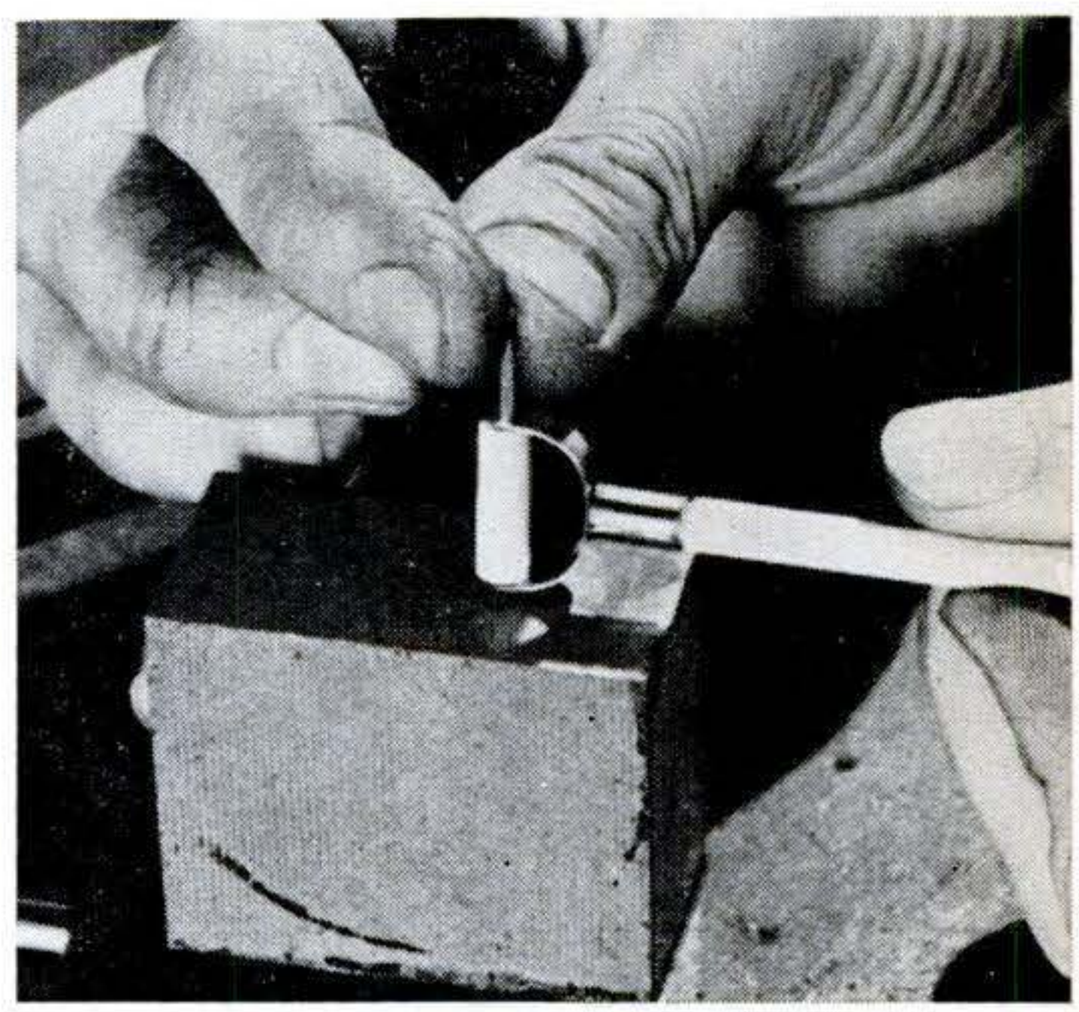
To shape the handle socket, rout a suitable groove, lay a nail over the blank, and hammer.



Form a recess in composition board and shape the shovel blank with a plastic-head hammer.



Handle and socket assembly are silver-soldered to the blade. Note that the joint is in back.



A noncorroding-wire rivet holds the wood grip in the U-shaped part of the handle assembly.

The other half of the handle socket is the mirror image of the first. A piece of 3/16″ stainless-steel wire is used for the handle. Shape it as nearly as possible like an actual shovel handle: rounded at the upper end, thinned a little along the upper half, and with the lower end necked down a bit and bent to fit the blade socket. By lightly silver-soldering the two halves of the socket to the handle along their centers, they will hold while the outer edges are hammered to a snug fit. Finally, apply silver solder to bond all pieces firmly and to fill any crevices that might be hard to clean.

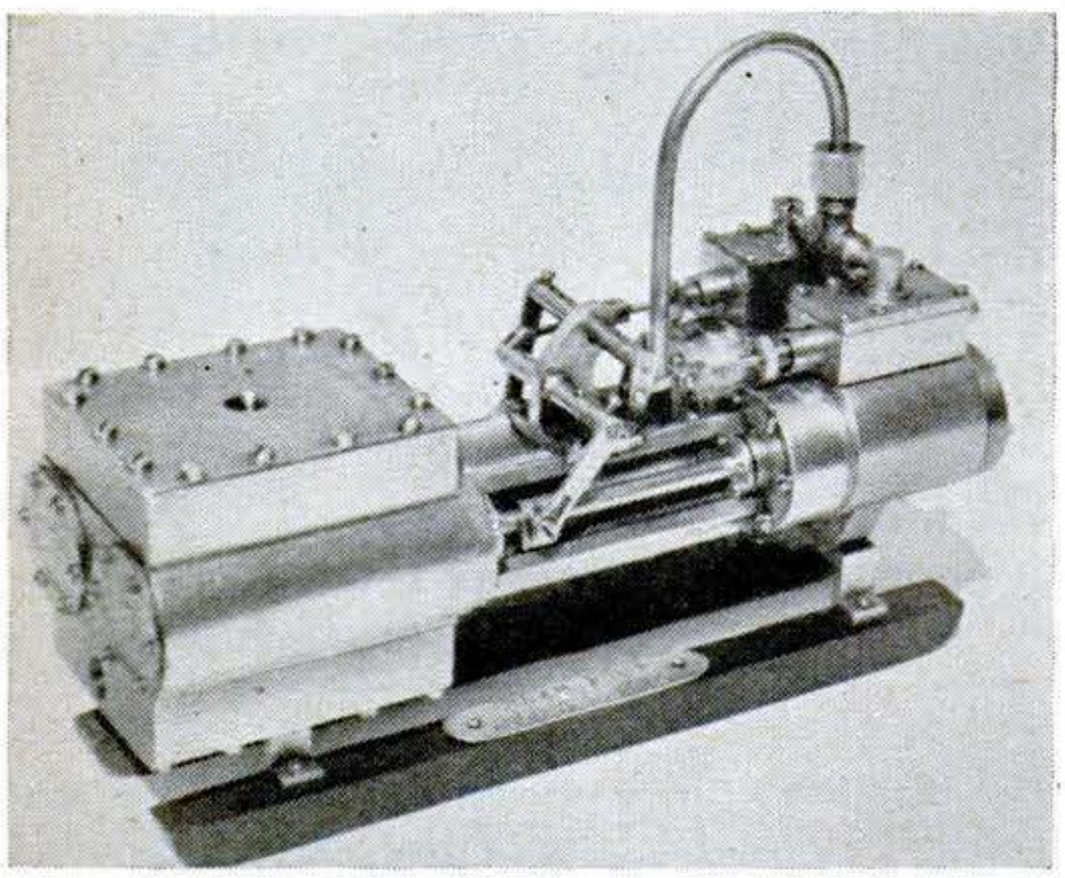
The coal scoop of Fig. 2 has a hickory handle. Cut out and shape the blade and shank. The D-handle is formed by silver-soldering together a short tubular piece and a U-shaped piece and inserting a wooden rod between the legs of the U.

An old hammer handle will yield plenty of hickory for the handle. Split out a piece and drive it through a ¼″ hole in a steel plate. Sand the resulting dowel until it is smooth and round. Cut off a small piece for the grip where it will be held by a stainless steel or silver-wire rivet. The handle should be a drive fit in the blade and grip sockets; if necessary, tiny rivets can be installed for further security. Polish the metal with fine abrasive cloth or paper of 360 or 400 grit and buff it to a high luster on a cloth wheel charged with fine compound. You can give the wood a coat of antique-maple or similar stain, followed by two coats of clear lacquer.—WALTER E. BURTON.

Copyrighted material

Electric Scooter Runs an Hour on Single Charge

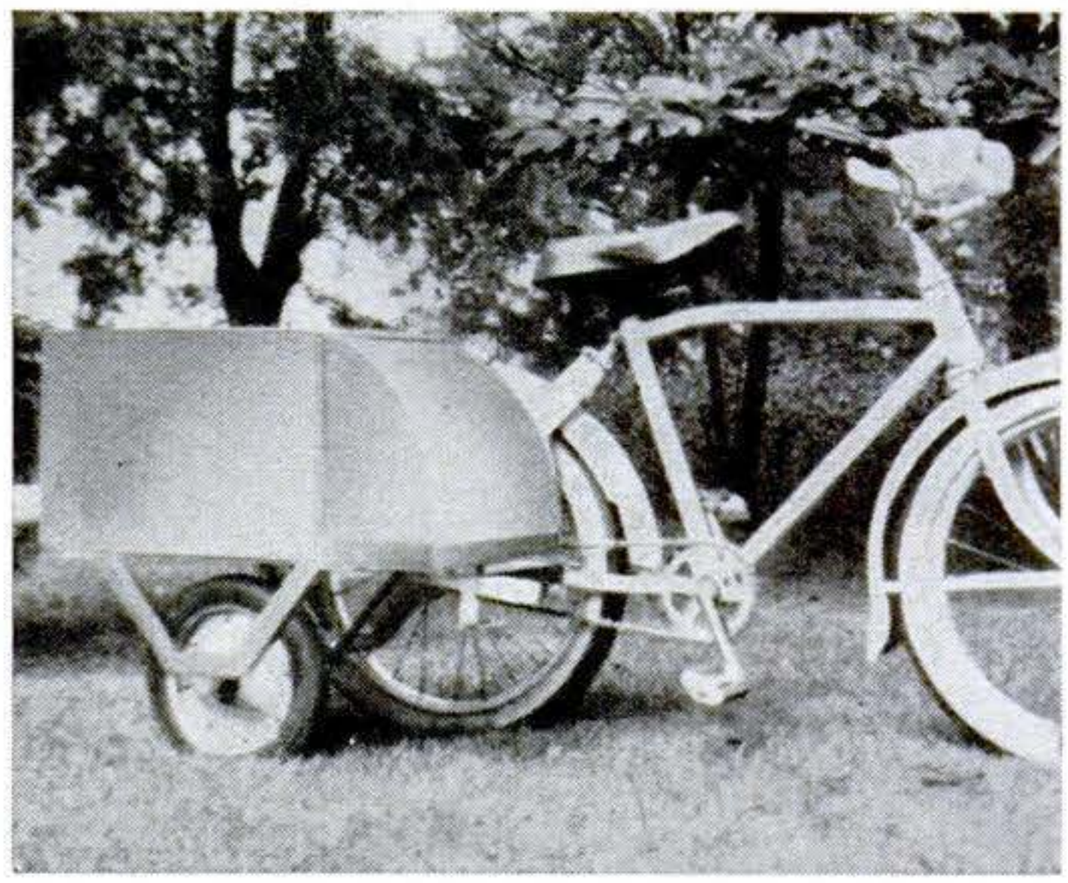
POWERED by an automobile starter motor, this child's electric scooter runs for more than an hour on one charging of its 6-volt battery. Built by John Albers, of Sioux City, Iowa, the scooter is operated by a switch button on the floor, an auto-starter solenoid being included in the circuit. A V-belt from the motor to the right rear wheel sends the vehicle along at a good clip, but not so fast as to be unsafe. A built-in rectifier charger may be plugged in (left above) to a 115-volt line to replenish the battery.



Tiny Steam Pump Lifts Liquid

THIS double-acting twin-cylinder model steam pump will lift a liquid for a height of 3′ and discharge it at the rate of a quart a minute. William H. Morrison, of Chester, Pa., is the builder.

Made mostly of brass, it is 9″ long, 4″ high, and has a 1½″ stroke. The bore of the steam cylinders is ⅞″ while that of the pump cylinders is ¾″. Four suction and four discharge valves are located in the pump end. The pump operates either by steam or compressed air, and it runs so easily that it may be demonstrated simply by blowing into the line. Parts were machined from solid stock.



Bicycle Driven by Electricity

Two 6-volt batteries connected in series furnish the power for a side-car drive installed on a bicycle by George M. Shoppe, of Plainfield, N. J. The drive unit itself consists of a converted automobile generator that drives a 10″ semipneumatic ball-bearing wheel by a V-belt. A welded angle-iron frame is attached to the bicycle with two ⅜″ U-bolts.

Two switches provide control, one being operated by hand and the other by foot. Though capable of only modest speeds, the bicycle has a range of 30 miles between charges.

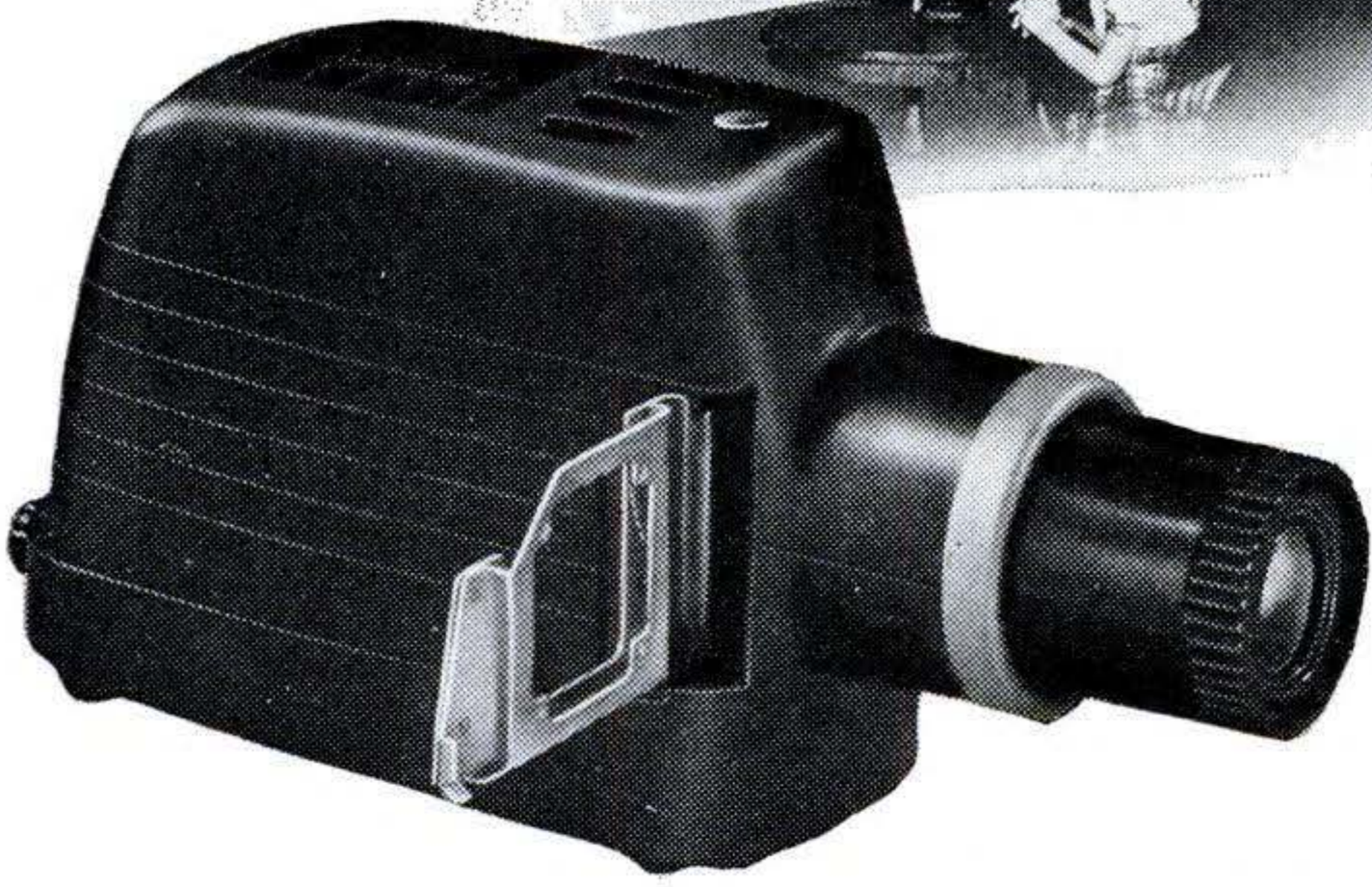
Copyrighted material

KODASLIDE PROJECTOR, MODEL 2A, answers the demand for better-than-average performance at a budget price. The Kodak Ektanon Lens 5-inch *f*/3.5 is highly color-corrected . . . Lumenizing of the entire optical system increases screen brilliance 50% . . . special heat-absorbing glass protects transparencies from overheating. It all adds up to more for your money. Price $47.50.

One is right for you

. . . in performance
. . . in price

KODASLIDE PROJECTOR, MODEL 1A *(see below)* is a star performer in any show. The whole family will get a kick out of its big, bright 40-inch-wide images . . . its sharp focusing with the Kodak Ektanon Lens 4-inch *f*/3.5 . . . its stepped-up screen sparkle through the completely Lumenized optical system. Socket in base provides handy mounting on tripod during projection. 150-watt lamp and slide carrier included. Price $27.50.



KODASLIDE PROJECTOR, MASTER MODEL *(see above)* makes your transparencies shine with a new, living realism—at home or in an auditorium. Its 1000-watt lamp delivers more light to the screen than any other 2 x 2-inch projector. Choice of 5 superb Kodak Ektar and Kodak Ektanon Lenses to meet every need . . . entire optical system Lumenized for maximum light transmission . . . efficient turbine fan cools lamp and both sides of slide. Comes with protective carrying case. Priced from $181 to $295 depending upon lens choice.

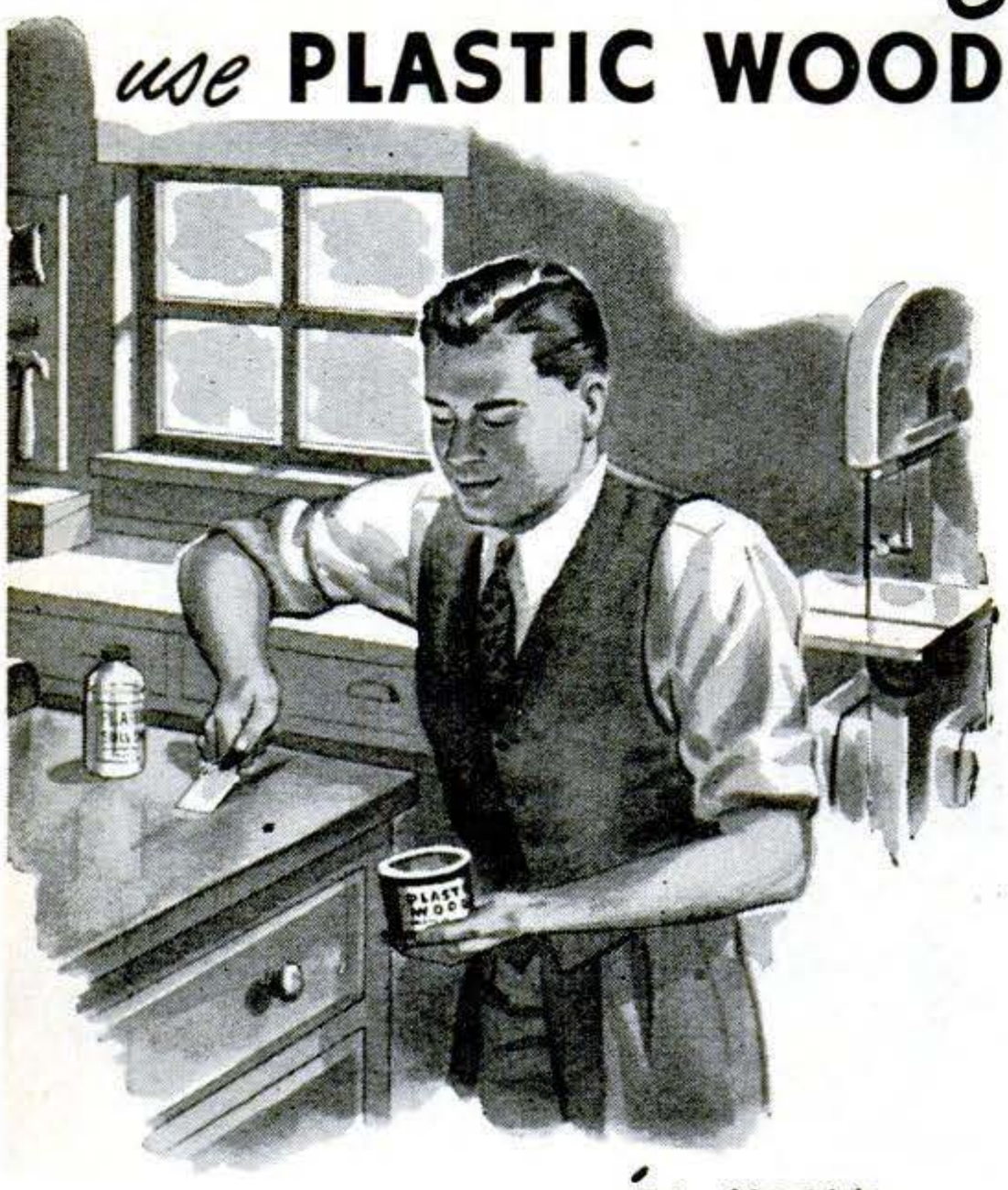
Eastman Kodak Company, Rochester 4, N.Y.

"Kodak" is a trade mark.

Kodak

Copyrighted material

For Cabinet Finishing *use* PLASTIC WOOD



in your **HOME WORKSHOP!**

If you'd like a satiny smooth, professional finish on your next cabinet job—use Plastic Wood! It's an ideal filler for cracks or rough grains, dries tight and hard, sands to a swell finish and takes paint, lacquer or varnish perfectly. Here's an extra hint—knot holes or gouges just disappear when this handiest filler is used! *Handles like putty—hardens into wood!*

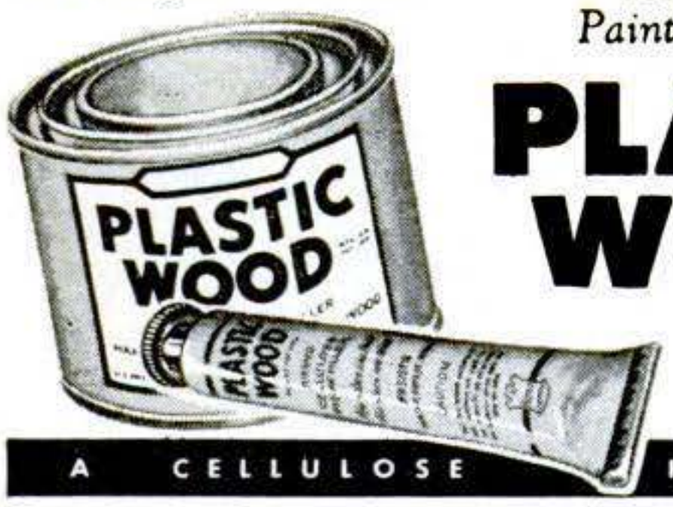
. . . dozens of other uses

FOR FILLING . . .	FOR REPAIRING . . .
• Countersunk screws	• Loose casters
• Chipped furniture	• Broken balusters
• Nail and screw holes	• Broken furniture

• *You'll want* Plastic Wood SOLVENT, *too.* Get both at one time. It is made especially to control the consistency of Plastic Wood . . . useful also in removing dried Plastic Wood from tools and fingers.

T. M. Reg. U. S. Pat. Off.

At all Hardware, Paint and 10c Stores



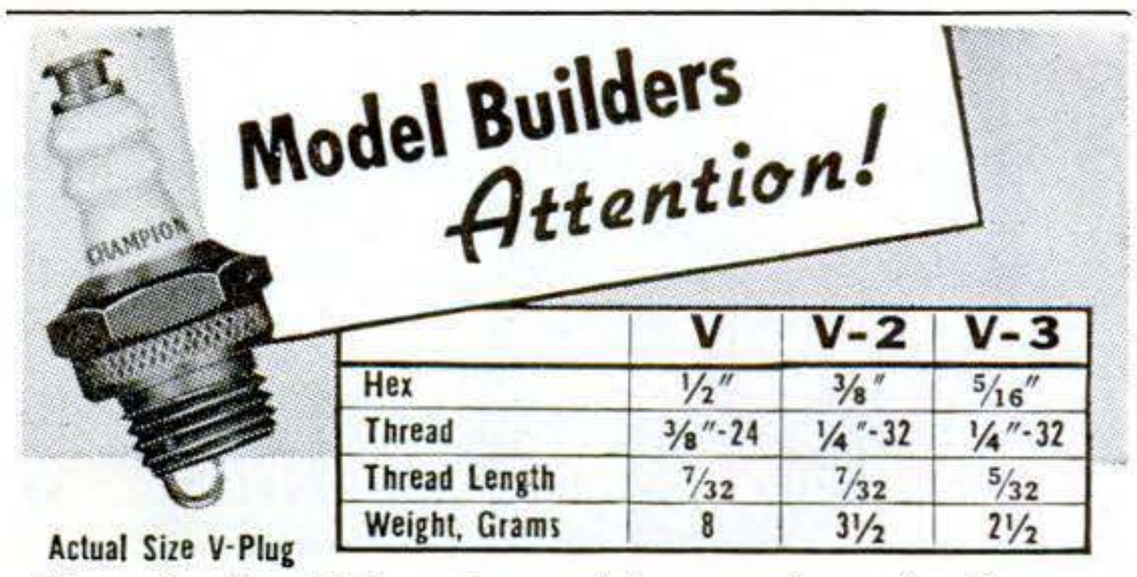
PLASTIC WOOD

Tube or Can

A CELLULOSE FIBRE FILLER

"Elevator" for Curtains

For convenience and safety, the labor-saving Curtainmaster eliminates climbing on a chair to hang, dust or take down drapes. A pair of sliding fittings, requiring only six screws and a few moments' time to install at each side of a window, hold any standard curtain rod. Simply loosen a pair of knobs within easy reach, and the curtains descend to position shown; raise the same extension handles, and the drapes are back in place.



Model Builders *Attention!*

	V	V-2	V-3
Hex	1/2"	3/8"	5/16"
Thread	3/8"-24	1/4"-32	1/4"-32
Thread Length	7/32	7/32	5/32
Weight, Grams	8	3 1/2	2 1/2

Actual Size V-Plug

Champion Spark Plugs for model gas engines give the same dependable performance as regular Champions. Champion Ceramic insulation—Sillment sealed. Alloy needlepoint electrodes for easy starting. One piece construction.

CHAMPION

SPARK PLUG COMPANY • TOLEDO 1, OHIO

Copyrighted material

Dependable

CHAMPION

America's Favorite Spark Plug

In rendering invaluable service to all America, the trucking industry must keep detailed records of operating and maintenance costs. That's why fleet operators are qualified experts on spark plugs. It is extremely significant that the majority of leading fleets everywhere prefer and use dependable Champion Spark Plugs.

FOLLOW THE EXPERTS

DEMAND NEW DEPENDABLE CHAMPIONS FOR YOUR CAR

Listen to the CHAMPION ROLL CALL . . . Harry Wismer's fast sportscast every Friday night, over the ABC network

Copyrighted material

This "egg-beater" is laying a continuous pipeline of reinforced hose. An anchor is dropped, then the helicopter moves on and the line is paid out astern. Or sections of metal pipe are dropped where men on the ground can assemble them.

Credit the Army Engineers for this pipe-dream-come-true. Since the helicopter can go anywhere a man afoot can go—and some places where he can't—you don't have to build costly roads for heavy ground equipment. Savings in time and money add up.

All through the peacetime Regular Army you'll find scientific advances like this being tested and perfected. If you've imagination and want to get ahead, here is your opportunity. Enlist for 3 years and you may choose your branch of the Service. If you're a high school graduate you can pick the precise training you want *before* you enlist.

There's good pay while learning, too. Food, clothing, shelter, medical care—cost you nothing. There's the chance to travel and almost unlimited educational opportunity. Get the details at your nearest U. S. Army and U. S. Air Force Recruiting Station.

CAREERS WITH A FUTURE

U. S. Army and U. S. Air Force

U. S. Army and U. S. Air Force Recruiting Service

★

YOUR ARMY AND AIR FORCE SERVE THE NATION AND MANKIND IN WAR AND PEACE

Copyrighted material

You can't beat riding a HARLEY-DAVIDSON!

It's freedom! It's fun! It's the lure of the open road that leads to faraway places. It's the thrill of exciting race meets, hill-climbs, endurance runs. It's the delight of "gypsy tours" and sightseeing trips. It's a wonderful way to say "Goodbye, care! Here comes happiness!" It's the world's greatest sport — and it's yours with a Harley-Davidson! Owning a Harley-Davidson Motorcycle is easier than you think. See your Harley-Davidson dealer today. Fill out and mail the coupon now.

HARLEY-DAVIDSON
Motorcycles

HARLEY-DAVIDSON MOTOR CO., DEPT. E, MILWAUKEE 1, WIS.

Send free copy of ENTHUSIAST magazine, filled with motorcycle action pictures and stories; also literature on 1948 models.

Name.....

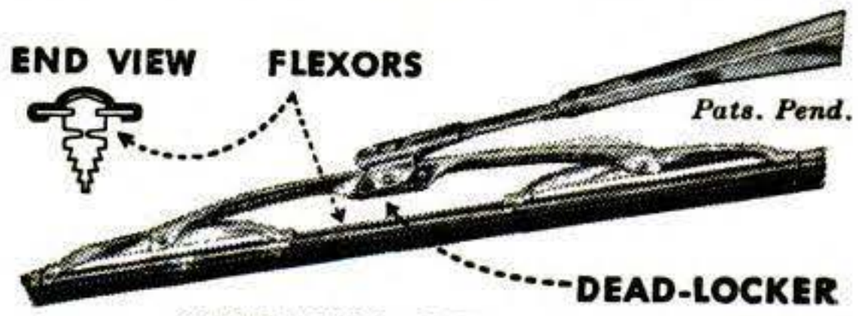
Address..... City..... State.....

Copyrighted material

TRY THIS AMAZING NEW

ANCO® CLEAR-FLEX
Trade Mark

WINDSHIELD WIPER BLADE



CAN'T FALL OFF—CAN'T BLOW OFF

FLEXES TO CLEAR THE LOW SPOTS

Know CLEAR-FLEX . . . the first Wiper Blade to conform fully to all windshield surface irregularities. Even wipes uniformly all types of curved windshields. Keeps clear those annoying hard-to-reach low spots common to all FLAT windshield glass. Clears quickly blinding road muck . . . slapped against your windshield from sloppy pavements . . . by passing cars. CLEAR-FLEX already has engineering approval for original equipment on coming models of high-grade cars.

THRILL WITH CLEAR-FLEX AS OUR "GUEST"

Deposit with your dealer only the regular retail price. Use CLEAR-FLEX through the next storm. Then IF you are willing, dealer is authorized to remove CLEAR-FLEX and refund all your money.

ANCO DEAD-LOCKER®

WIPER ARM

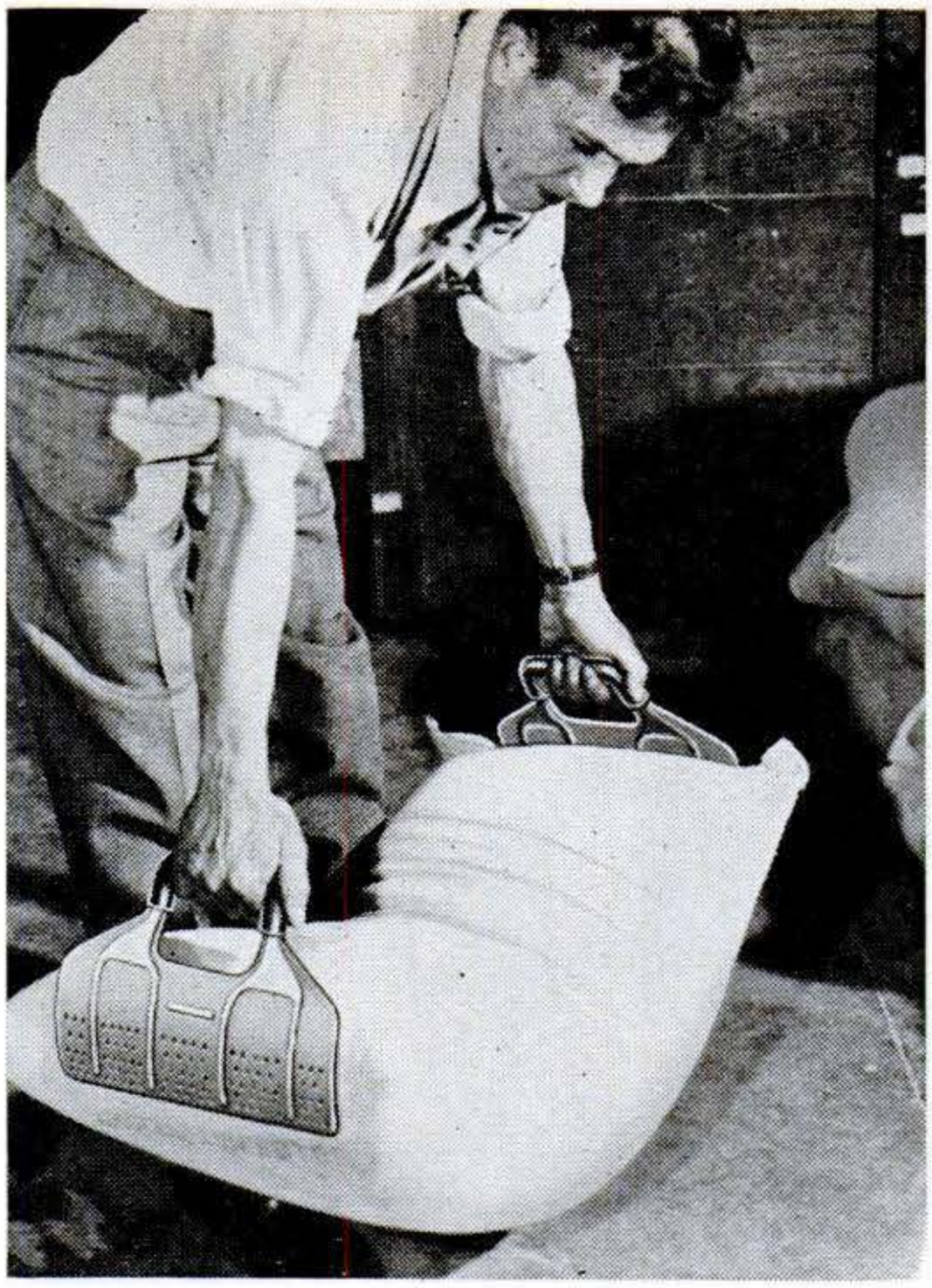
ANCO Arm fits quickly any wiper shaft. Suits any good wiper motor. Holds Blade true . . . at correct pressure. If not now on your car, ask serviceman to install a PAIR quickly for you. More than 250,000 good gas stations and service stores sell ANCO BETTER Blades and Arms.

Made by the makers of long-famous ANCO RAIN-MASTER® Blades and Arms . . . original equipment for years on DeLuxe models of high-grade cars. Your dealer knows ANCO.

Get yours next time you buy gas.
May save you a costly smashup.

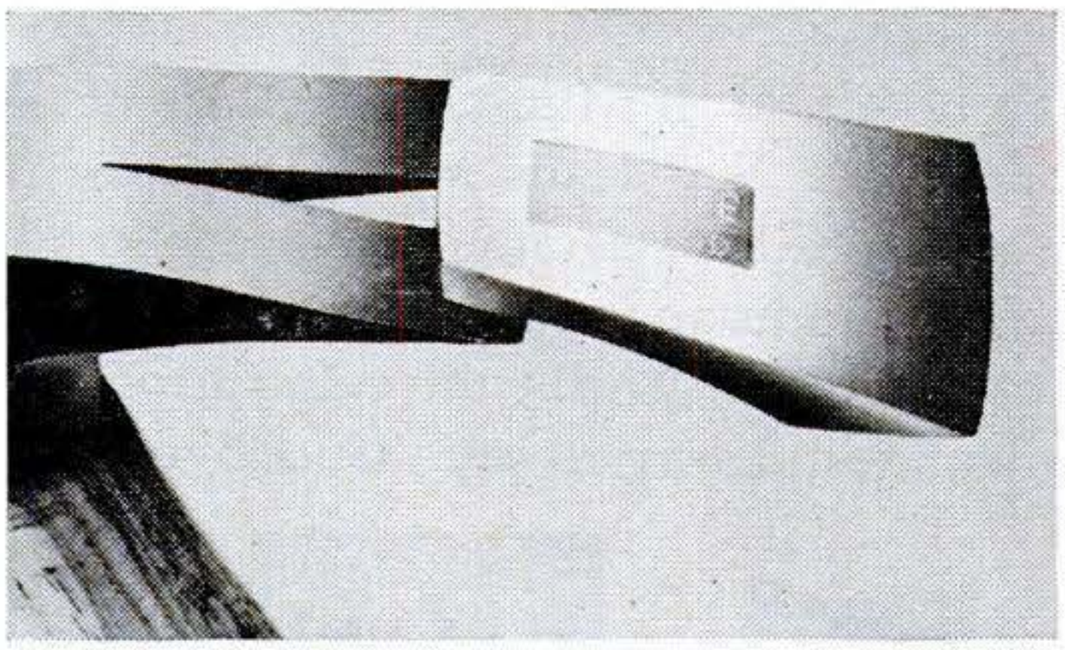
Quality Protected Under Fair Trade Laws
ANCO Patented Products—Patents Make Jobs

THE ANDERSON COMPANY
Established 1918
GARY, INDIANA



Handles Grip Sacks

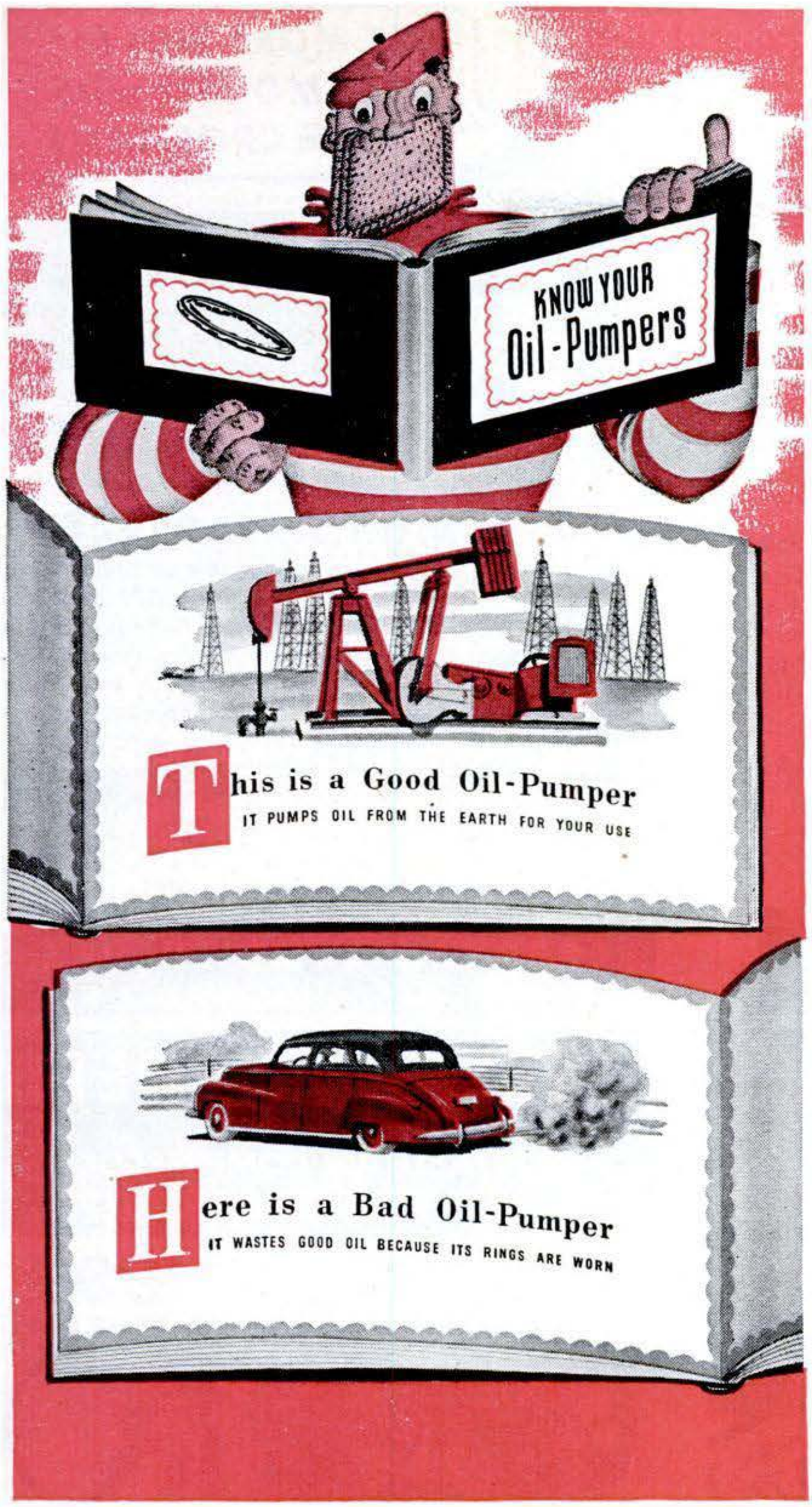
HERE'S a gadget designed to save your fingernails and temper when lifting heavy sacks. Handles are attached to curved steel plates covered with hundreds of small projecting points. Slap one on each end of a sack, and the points grip without tearing. The grips are manufactured by Palmer and Rodgers, of Roscoe, Calif.



Hatchets from Hammers

ANY claw hammer can double as an adz or hatchet when fitted with the Adzette—a steel head with a 2½-inch cutting edge on one end and a V-wedge on the underside. Knock the wedge between the hammer claws—the cutting edge is ready. It is made by Hercules Forge Corp., of Los Angeles.

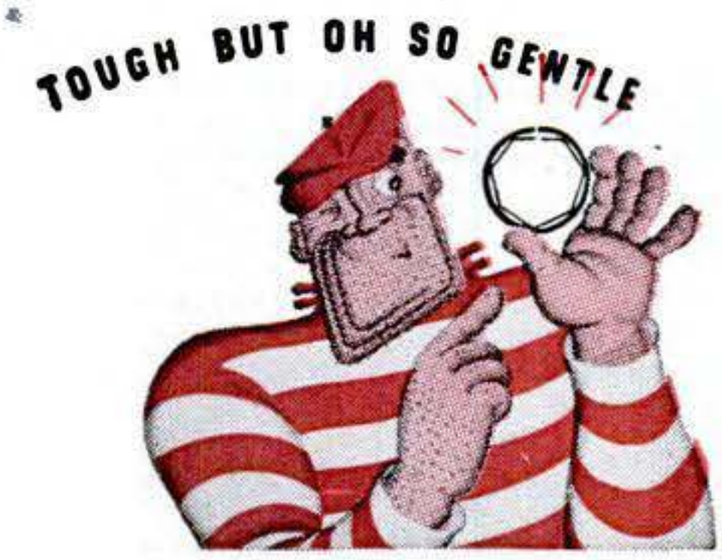
Copyrighted material



OIL-PUMPING in your car warns that you need new piston rings. It's the *first* sign of worn-out rings and the danger signal of undue engine wear.

Fortunately, rings are *replacement* parts. And when you replace with Hastings Steel-Vent piston rings, you *stop* oil-pumping, *check* cylinder wear and *restore* performance. It's the best money you can spend on your car.

HASTINGS MANUFACTURING COMPANY
HASTINGS, MICHIGAN
HASTINGS LTD., TORONTO



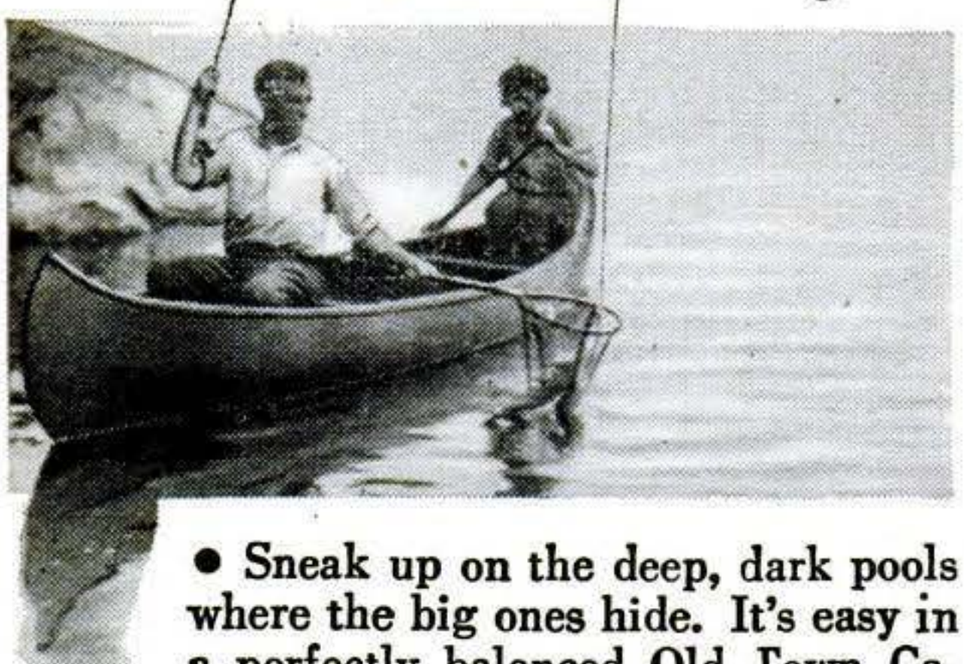
HASTINGS

STEEL-VENT PISTON RINGS

TOUGH *on Oil Pumping*
GENTLE *on Cylinder Walls*

Copyrighted material

Hook 'em and cook 'em the Indian way



• Sneak up on the deep, dark pools where the big ones hide. It's easy in a perfectly balanced Old Town Canoe. This modern birch-bark is built for sportsmen. Steady and strong, yet light to carry. Made with Old Town skill to last for many a moon.

FREE CATALOG shows all kinds of canoes for paddling, sailing or outboards. Also outboard boats, including big all wood family boats. Sailboats. Rowboats. Dinghies. Address Old Town Canoe Company, 442 Wood Street, Old Town, Maine.

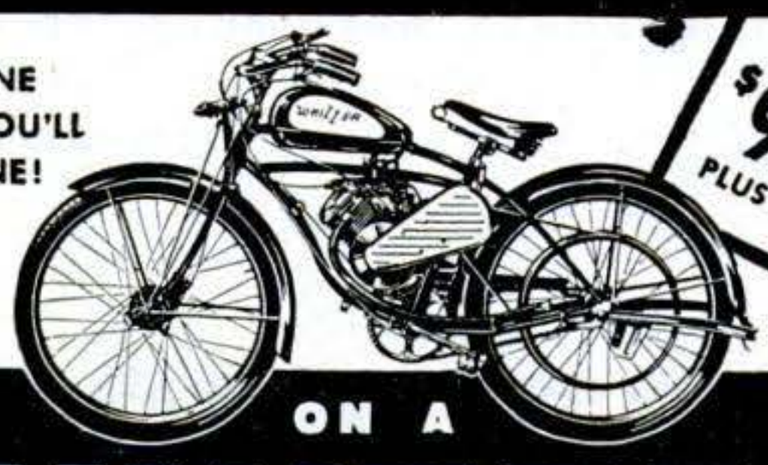
"Old Town Canoes"

A PENNY BUYS

Go places for pennies . . . with a Whizzer Motor on your bike! This sturdy, modern motor fits any balloon tire bike . . . takes you 125 miles per gallon, at speeds up to 35 m.p.h. It's America's thriftiest power transportation, engineered for years of trouble-free performance! Get in the Whizzer Parade!

A 6-MILE RIDE

RIDE ONE AND YOU'LL BUY ONE!



ONLY $97.55 PLUS TAX

ON A

WHIZZER

Whizzer Motor Company, Dept. 532, Pontiac, Michigan.
I enclose $99.97, which includes $2.42 Federal Excise Tax ( ) check or ( ) money order. Send me one Whizzer Motor complete, ready for installation.
If descriptive literature only is desired, check here ( ).

Name _____ City _____

Street _____ State _____

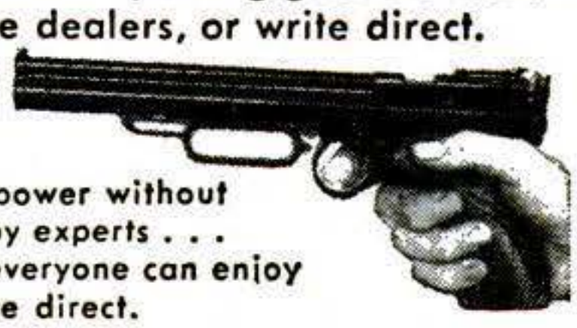
GET MORE FUN for LESS MONEY with a CROSMAN!

ADJUSTABLE POWER *without powder* means you can shoot your Crosman indoors with safety and accuracy, without recoil, noise or odor. It means keen sport outdoors, too . . . target shooting, small game. Ammunition (Super-Pells) less than 1/3 cent a shot.

Crosman *Silent* RIFLE

. . . is available in single-shot or magazine types, .177 or .22 cal. A man's size, fine quality gun, with perfect balance, rifled barrel, rear peep and blade front sights. At sporting goods or hardware dealers, or write direct.

Crosman "Bullseye"



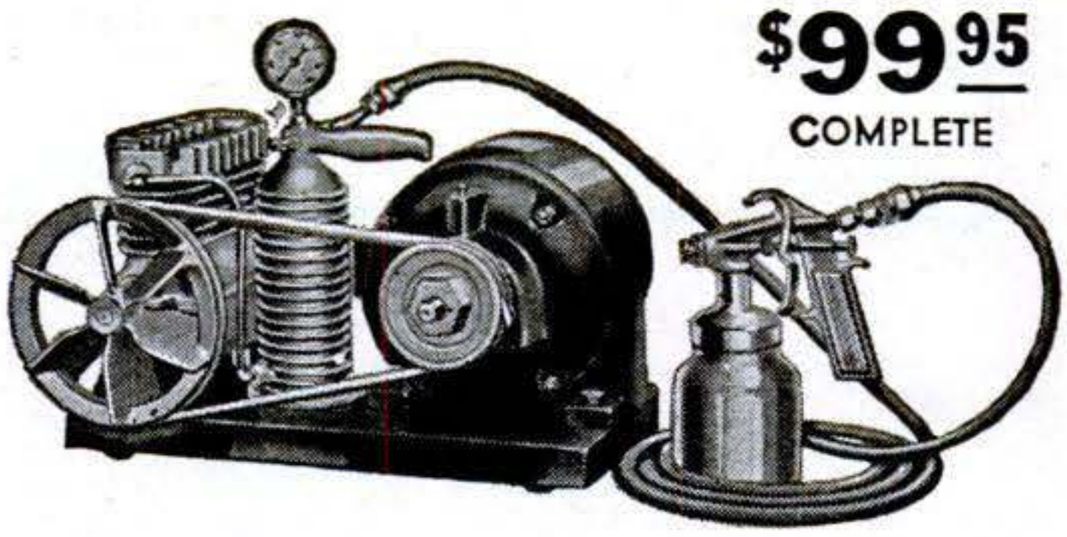
is a new .177 cal. single-shot target pistol with all Crosman "power without powder" advantages. Endorsed by experts . . . inexpensive to own and shoot—everyone can enjoy it. At your dealer's . . . or write direct.

CROSMAN ARMS CO., INC.
9 HENRIETTA ST. • ROCHESTER 7, N. Y.

PRESSURE QUEEN

FOUR CYLINDER
PORTABLE AIR COMPRESSOR
SPRAY PAINTING OUTFIT

$99.95 COMPLETE



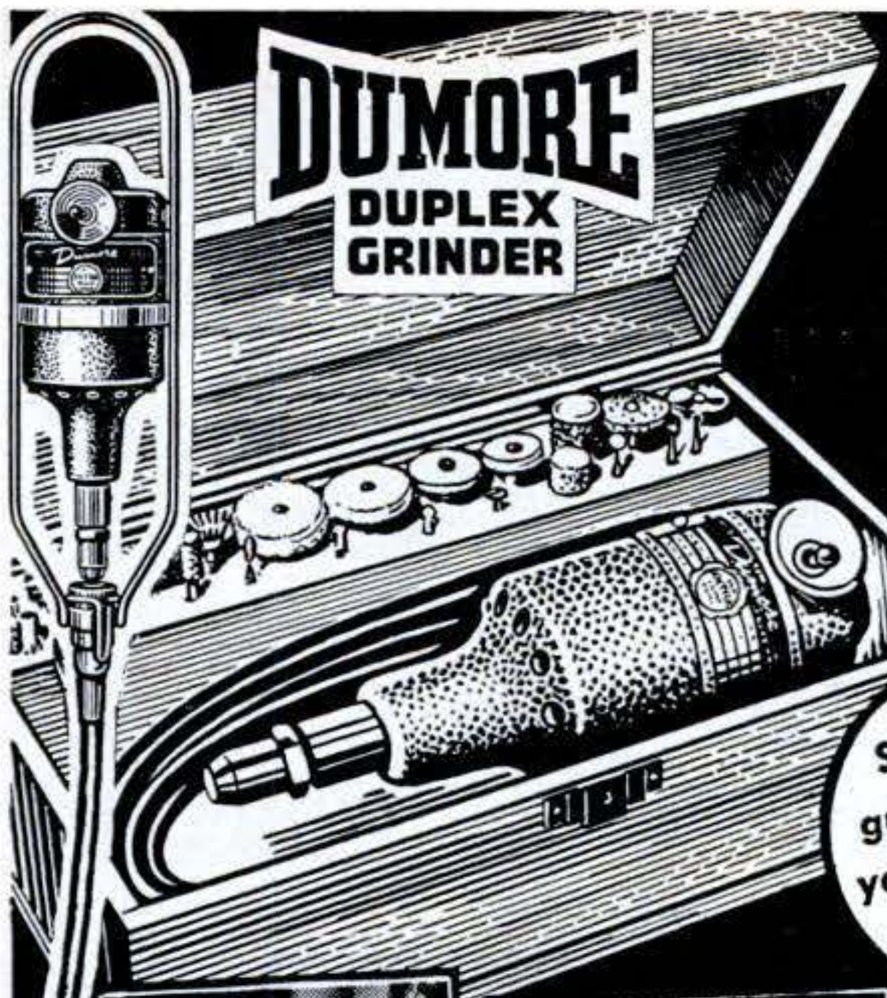
COMPACT • RUGGED • POWERFUL

The ideal air supply for home and farm workshop, machine shop, garage, service station and contracting painter. Inflates tires; refinishes automobiles, trucks, implements and furniture. Paints buildings better, faster and at lower cost than brush work. Compressor has 4 cylinders, drop forged crankshaft, heat treated valves and pistons, bronze bearings, forced feed lubrication. 50-60 lbs. pressure without pulsation. Price includes compressor as shown, with air gauge, 15 ft. hose, spray gun and 1/3 h.p. motor; fully guaranteed. With 1/2 h.p. motor—$109.95.

IF YOUR DEALER DOES NOT SELL PRESSURE QUEEN WRITE DIRECT.

THE CAMPBELL-HAUSFELD CO.
151 RAILROAD AVE. HARRISON, OHIO

Copyrighted material



More Power, More Capacity, and More Versatility — than any other handgrinder!

Satisfaction guaranteed or your money back in 10 days!

Makes your work easier, faster, twice the fun!

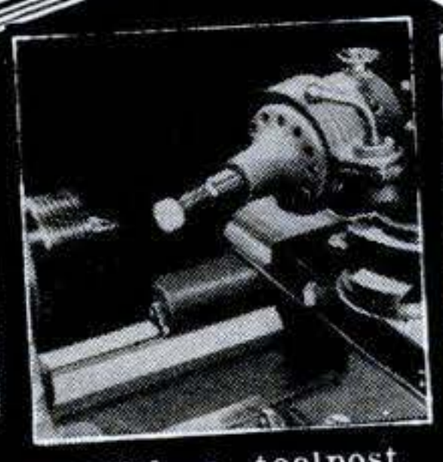
Here's the handgrinder you've always wanted for your workshop — the tool that gives you **more** of everything you want, than any other handgrinder. Its full 1/14 HP motor has the extra power for "heavy" jobs. Its extra-capacity chuck takes all 3 tool sizes—1/4", 1/8", 3/32".

With a simple, easy-to-use attachment, your Duplex becomes a flexible-shaft tool. Other attachments convert it instantly for bench or lathe work.

Think what you can do with the extra power, capacity, and versatility of the Dumore Duplex! Work in wood, metal, and plastics is faster, easier — and twice the fun!

The powerful Duplex is the perfect gift for any hobby-minded man or boy. See it in your local hardware store today —or send in the coupon below!

Flexible shaft attachment doubles the usefulness of your Duplex.



With a toolpost bracket, your Duplex serves as a lathe-grinder.

Bench stand converts your Duplex into a third tool.

If you want a good handgrinder — buy a Dumore!

Tear out this coupon and mail today!

The Dumore Company, Dept. B-52, Racine, Wis.

☐ Please send complete information on Duplex Grinder.

☐ Send me DeLuxe Duplex Kit (27 accessories as illustrated); $27.50 enclosed.

☐ Send me Standard Duplex Kit (9 accessories); $19.75 enclosed. Shipping charges C.O.D. Attachments are extra.

Name_____

Address_____

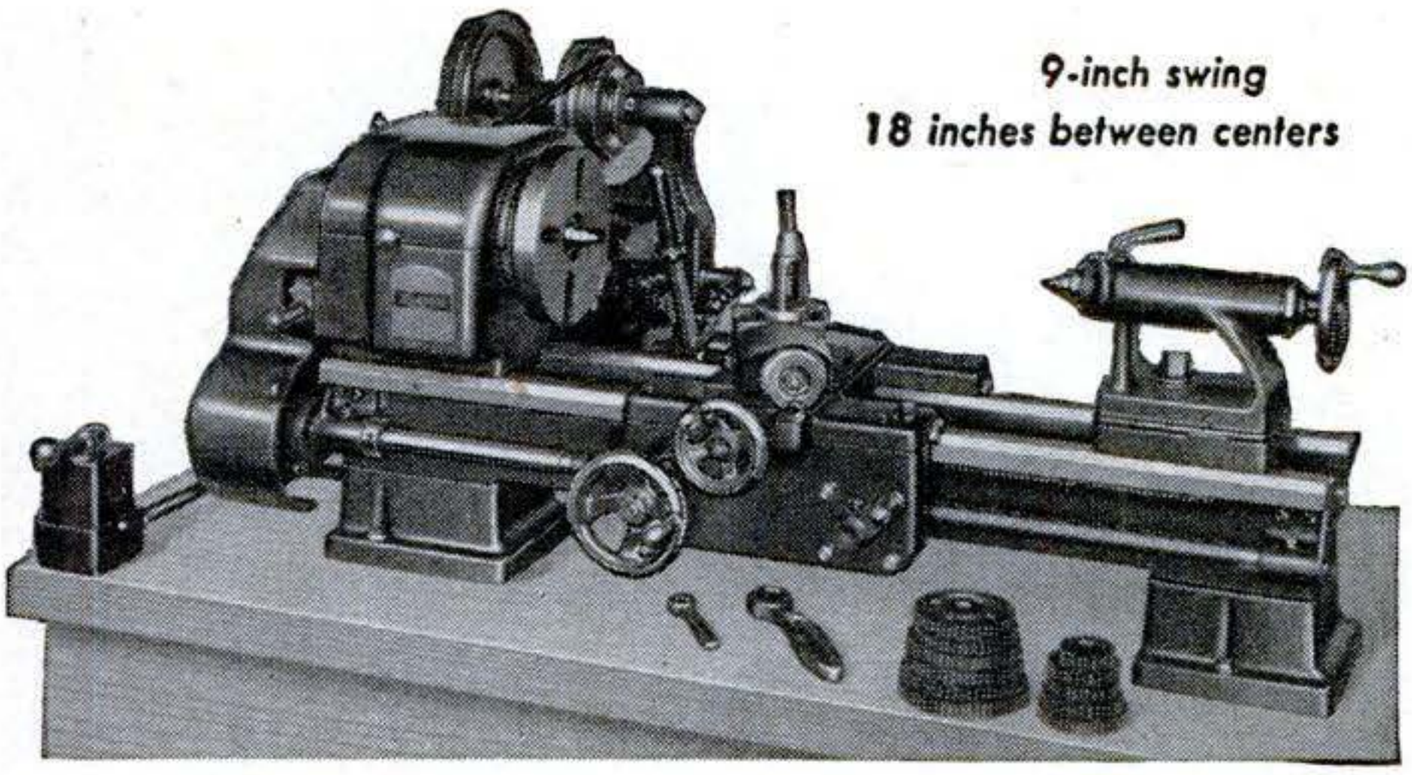
City_____(____) State_____

H-6B

A NAME TO REMEMBER WHEN YOU THINK OF **BETTER** LATHES AND SHAPERS

Logan

SPEED, ACCURACY AND RUGGEDNESS



9-inch swing
18 inches between centers

Make This 9-Inch Logan Lathe a Stand-Out at $159.50

● Here in compact, 9-inch size are the speed, accuracy and precise, rugged construction that make the larger Logan Lathes outstanding industrial performers. High speed, ball bearing spindle stays accurate. Self lubricating bronze bearings protect vital points. Bed ways precision ground to within .0005" of parallelism. See it at your Logan Lathe dealer's, or write for information.

DISTRICT OFFICES

Woolworth Bldg. New York 7, N. Y. Cortland 7-8024

550 W. Washington Blvd. Chicago 6, Illinois Central 1246

1672 Mission Street San Francisco, Calif. Underhill 6682

700 Commerce St. Dallas 2, Texas Central 4075

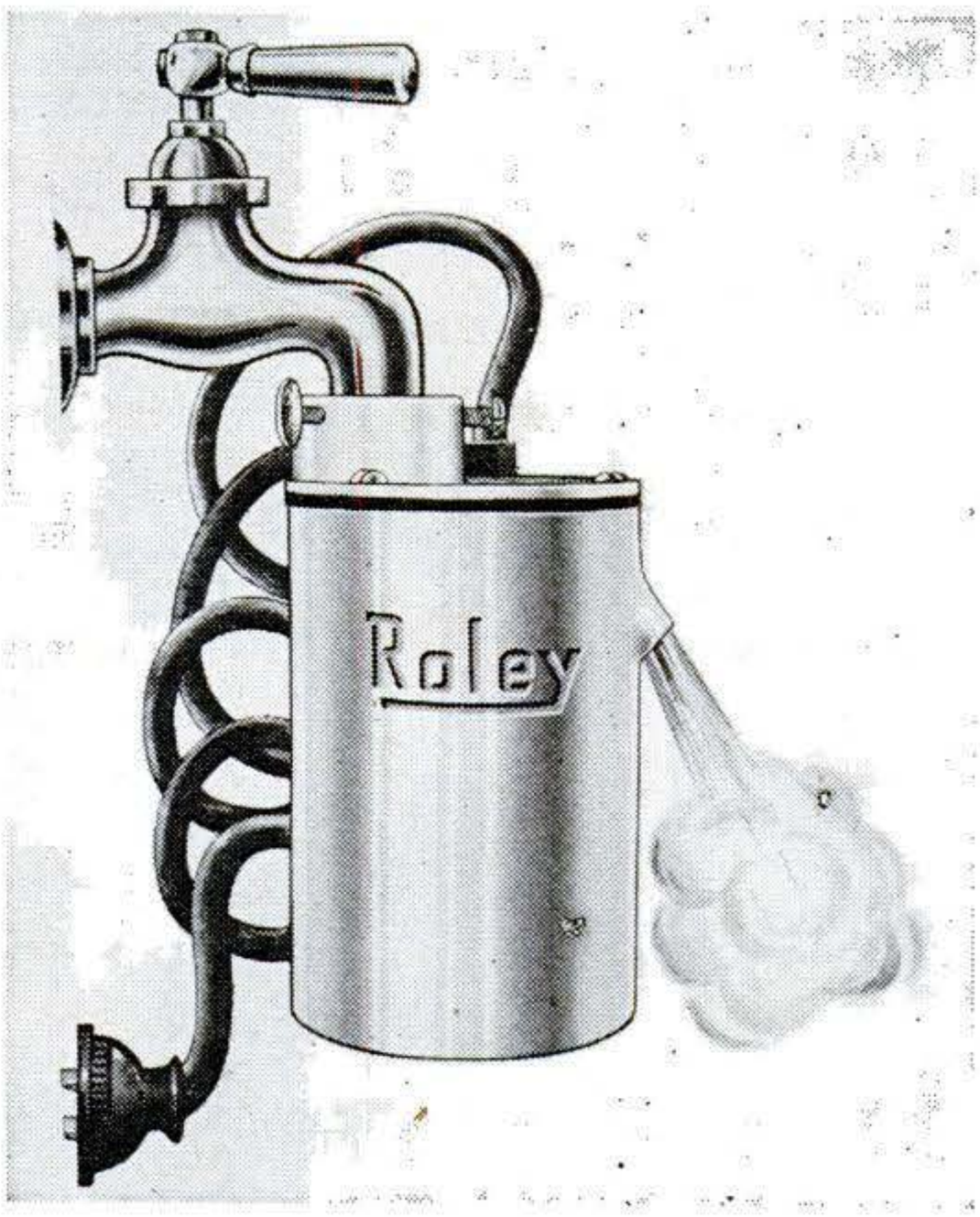
LOGAN ENGINEERING CO., Dept. CC-2 CHICAGO 30, ILLINOIS

Copyrighted material

FREE HANDY CHART
New! Illustrates and charts the 5 great Johnsons for '48. Sent free. Write!... Look for the name of your Johnson Dealer under "Outboard Motors" in your classified phone book.
JOHNSON MOTORS, 500 Pershing Road, Waukegan, Illinois
Johnson Motors of Canada, Peterboro, Canada

Tops Show Contents

EVERYTHING in these Vue-Bins is instantly visible, thanks to their transparent plastic tops, so no labels are needed. They come in 10 sizes for everything from screws and nails to buttons and postage stamps. The lids twist on. The containers are made of rustproofed metal by the Buckeye Stamping Co., of Columbus, Ohio.



Water Heated at Faucet

THIS electric faucet heater is reported to heat a gallon of water from 60° to 140° in three minutes. Made by the Roley Sales Co., of New York City, it plugs into any 110-120-volt electric outlet. The faucet handle regulates temperature and quantity.

Copyrighted material

IT'S A GRAND FEELING, TO BUILD A WINNER

Mr. Robert Brightman, photography editor of Mechanix Illustrated, is shown displaying Walter A. Musciano's splendid 32-inch control line model of the plane that Frank Hawks flew to fame in 1930. It has won two first prizes so far.

IT'S A GRAND FEELING, TOO, WHEN YOUR CAR IS CUSHIONED WITH MARFAK CHASSIS LUBRICATION

THAT CUSHIONY FEELING LASTS LONGER WITH **MARFAK!**

The smooth, easy handling of a car with *Marfak* Chassis Lubrication is evidence that a tough, long-lasting lubricant is on the job. A *Marfak* job protects your chassis for a thousand miles or more. Ask your Texaco Dealer to give your car that "*Marfak* feeling" . . . today!

TEXACO

REG. T. M.

THE TEXAS COMPANY

TEXACO DEALERS IN ALL 48 STATES

Tune in: TEXACO STAR THEATER presents the TONY MARTIN show featuring Alan Young every Sunday night. METROPOLITAN OPERA broadcasts every Saturday afternoon. See newspaper for time and station.

Copyrighted material

WHEN CASTER GUIDES WORK LOOSE DO THIS:

Mix Smooth-On No. 1 Iron Cement with water to consistency of soft putty and fill it into the hole in which guide goes. While cement is still soft insert the guide, driving it home. Smooth-On hardens quickly, expands slightly in hardening and holds guide firmly in place.

USE SMOOTH-ON FOR BIGGER REPAIRS, TOO

Use it to stop leaks and seal cracks in boilers, furnaces, piping, radiators and auto parts. Tighten loose handles, hinges, knobs, bolts, screws and rivets with Smooth-On. Professional repair men have been using Smooth-On for over 50 years. Buy it in 1¾-oz., 7-oz. or 1-lb. size from your hardware dealer—if he hasn't it, write us.

FREE 40-PAGE HANDBOOK

Filled with tested time- and money-saving repair ideas. 170 illustrations. Clear, simple directions. Just mail the coupon.

——— Sign and Send Now ———

Smooth-On Mfg. Co., Dept. 58B,
570 Communipaw Ave., Jersey City 4, N. J.

Please send me my free Smooth-On Handbook

Name.....

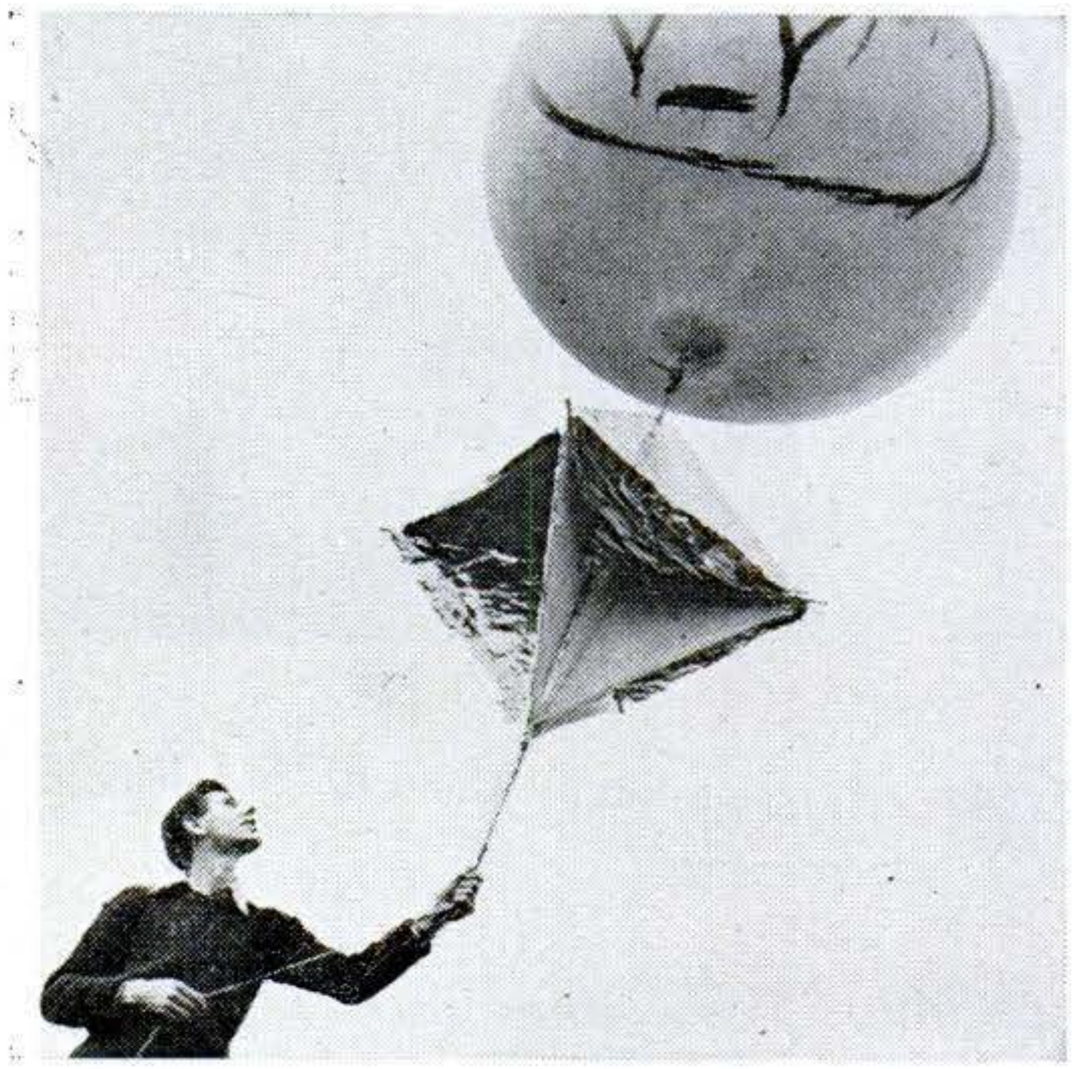
Address.....

2-48.....

Do it with **SMOOTH-ON**
THE IRON CEMENT OF 1 000 USES

Blanket for Jets

THIS blanket keeps jet engines' heat where it belongs. Fitted around a jet cone, it keeps adjacent parts of the plane under 200° even when temperatures inside the cone reach 2,000°. Called the Thermoflex Insulation Blanket, it is asbestos fiber, shielded with metallic membrane.



Balloon Bounces Radar

SIX hundred feet above Westinghouse's East Pittsburgh lab, this five-foot balloon acts as a target for radar tests. Ultra-short-wave pulses beamed from a special antenna hit the aluminum-foil reflector hanging from the bag and bounce back to the receiver without running into hills or tall buildings. The balloon target is being used for measurements and calculations vital to the design of new equipment, such as a possible revolutionary robot gunner for aircraft.

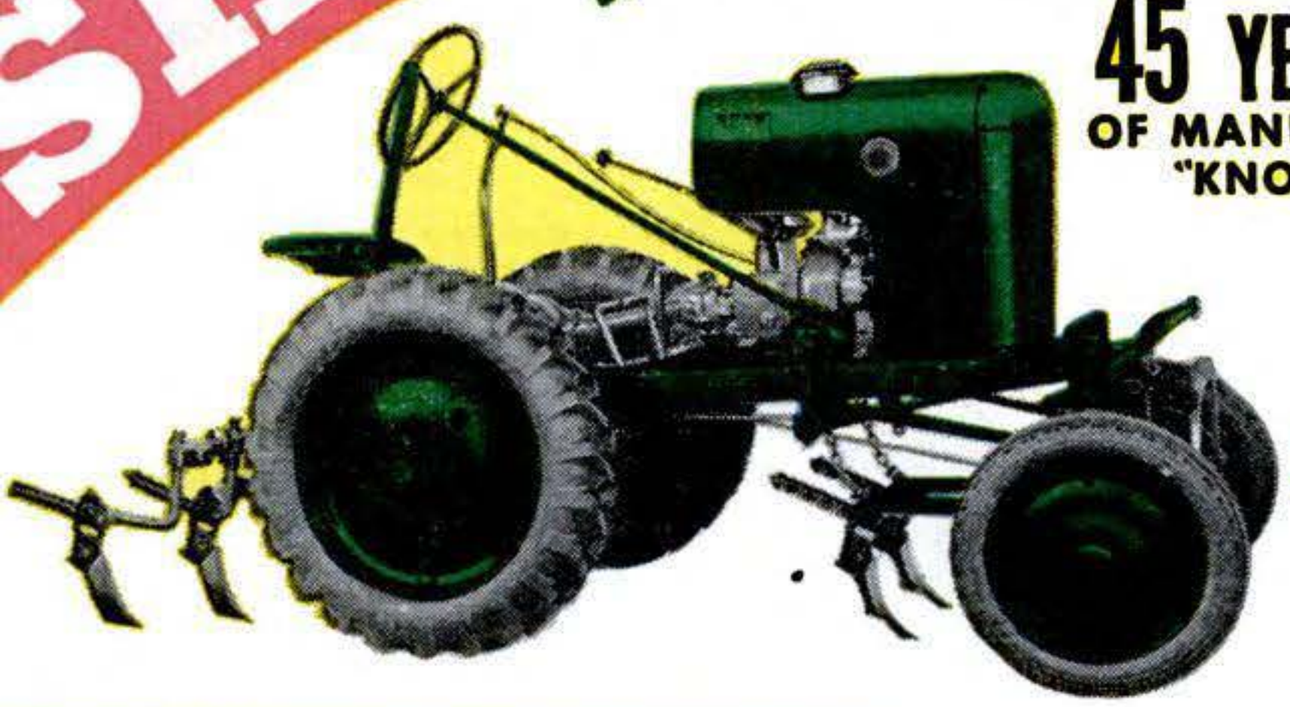
Copyrighted material

SAVE TIME AND WORK—MAKE MONEY with

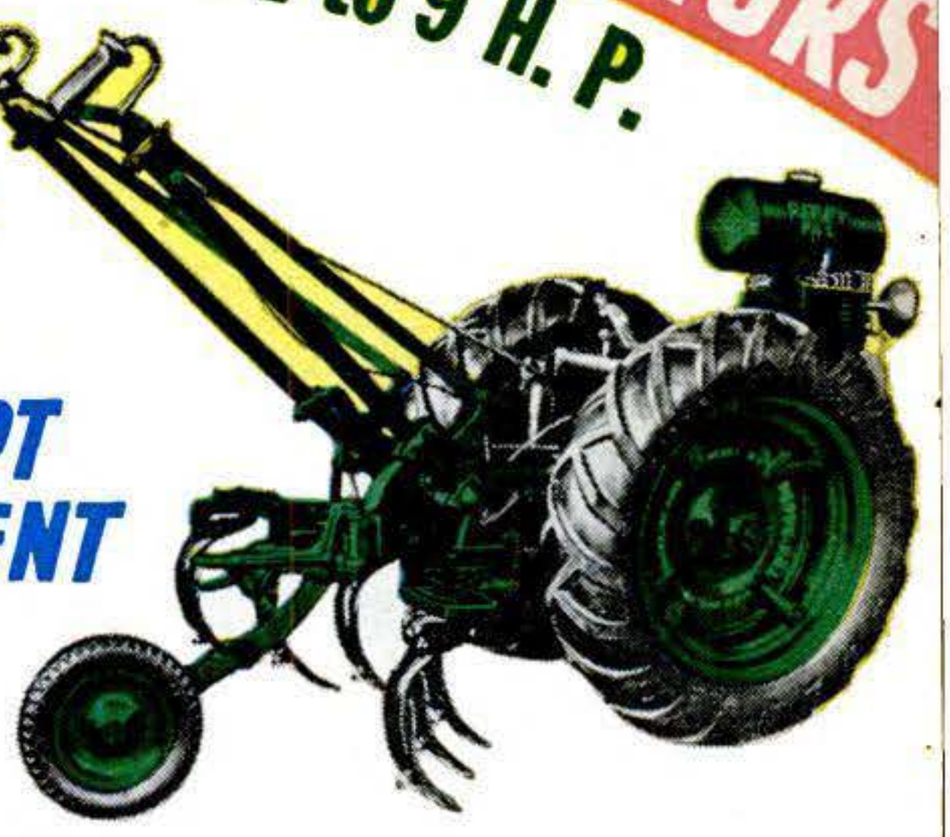
SHAW "DU-ALL" and "PEPPY-PAL" TRACTORS

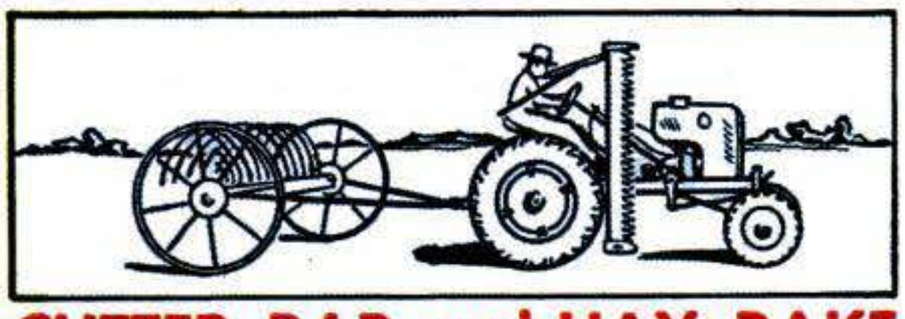
RIDING and WALKING MODELS—1½ to 9 H. P.

Backed by
45 YEARS
OF MANUFACTURING
"KNOW-HOW"



PROMPT SHIPMENT



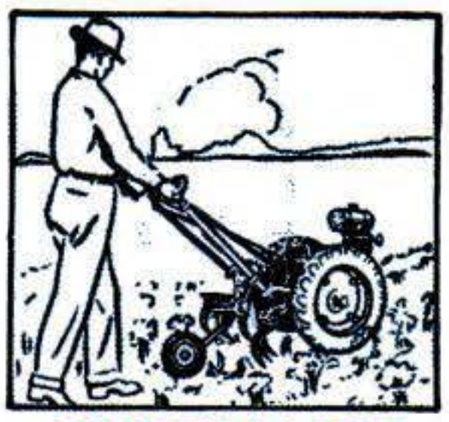


CUTTER BAR and HAY RAKE

PLOWS and CULTIVATES

Shaw tractors are the result of more than 45 years' experience in building tractors and other farm equipment. They're built by men who have the "know-how" of both farming and mechanics. That's why every Shaw tractor carries a full year's guarantee protecting you against any defect in workmanship or material.

PLOWS



CULTIVATES

TOP QUALITY MATERIALS

Built almost entirely of steel, arc-welded and consisting of thoroughly field-tested parts, Shaw tractors are famous for their dependability, utility and low upkeep. You can buy them with complete confidence.

LOW FACTORY PRICES

A modern factory and streamlined production methods assure you substantial savings. Shaw Du-All and Peppy-Pal tractors are available through dealers or direct from the factory. Mail the coupon for full information and special price list.

FREE FOLDER and Price List! MAIL COUPON TODAY!

Dozens of Jobs Done Quickly and Easily

Do all kinds of hard jobs the easy way with Shaw Du-All or Peppy-Pal tractors . . . jobs that produce more food and feed, in less time with less work . . . at less cost. You can plow, cultivate, mow, harrow, disk, spray, grind, bulldoze, plow snow, saw wood and do many kinds of belt jobs, dig, haul, seed and scores of other jobs with these sturdy, powerful tractors.

Their extra-strength construction, precision engineering and efficient power utilization mean top performance on the most rugged job.

IDEAL FOR GARDENS, SMALL FARMS

Shaw walking and riding tractors are dependable, all-around economical workers . . . ideal for truck farms, gardens, orchards, nurseries, poultry farms, golf courses, estates, and cemeteries. They're always ready, always willing . . . a size to fit your needs — 1½ to 9 H.P.

Many outstanding features make Shaw tractors easy to operate — women and children enjoy running them. Equipment is easily attached with the "Jiffy Hitch," handles are adjustable. Models with variable speeds — forward and reverse. Also power turn.

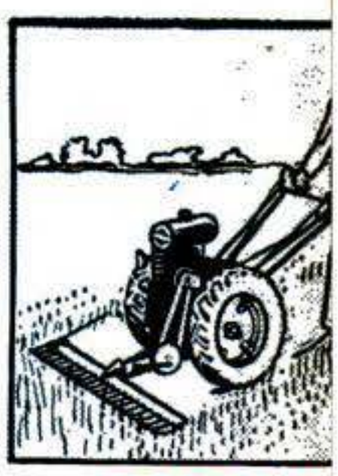
SOON PAYS FOR ITSELF

Shaw tractors save so much time and labor and get so much work done, at such low cost, they pay for themselves quickly and many times over. Hundreds of operators use Shaw tractors to earn spare-time money.

CHEAP TO OPERATE

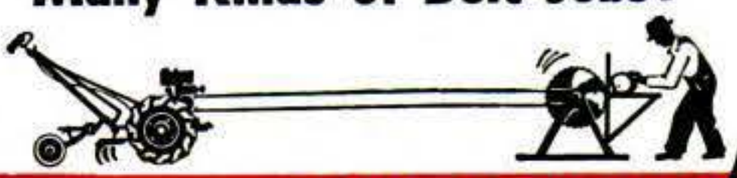
Just a few cents an hour will operate your Shaw tractor. They're strong, rugged, well-built . . . give you years of good service with very low maintenance expense. The initial cost is amazingly low . . . write today for full information and price lists.

HARROWS



MOWS

SAWS WOOD — Does Many Kinds of Belt Jobs!



ACT NOW!

SHAW "DU-ALL" and "PEPPY-PAL" TRACTORS

Send no money MAIL COUPON FOR PRICE LIST AND FREE FOLDER

SHAW MANUFACTURING CO.
5702 Front Street, Galesburg, Kansas or
668-PS North 4th Street, Columbus, Ohio

Please send me Free Folder and price list.

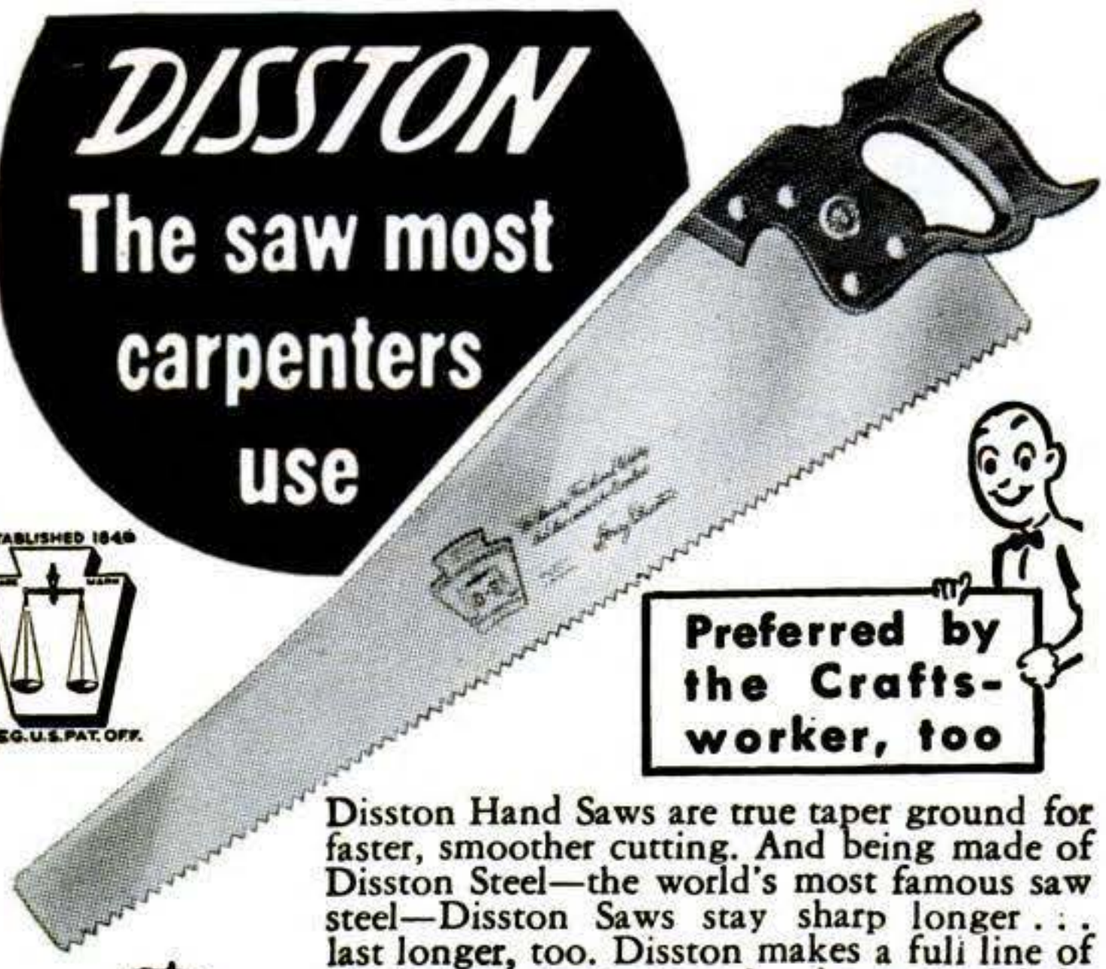
Name_____

Address_____

_____

Copyrighted material

DISSTON
The saw most carpenters use



ESTABLISHED 1849
REG. U.S. PAT. OFF.

Preferred by the Craftsworker, too

Disston Hand Saws are true taper ground for faster, smoother cutting. And being made of Disston Steel—the world's most famous saw steel—Disston Saws stay sharp longer . . . last longer, too. Disston makes a full line of hand saws, circular saws, band saws, and dado heads for home workshop use. Ask your Hardware Retailer.

Mail Coupon for FREE COPY
The Disston Saw, Tool and File Manual tells how to choose, use and care for tools.

HENRY DISSTON & SONS, INC.
210 Tacony, Philadelphia 35, Pa., U. S. A.
Please send me FREE copy of Disston Saw, Tool and File Manual.
NAME_____
ST. & NO. _____
CITY_____ STATE_____

U. S. NAVY 7x50
PRISM
BINOCULARS
with Coated Optics

Used but in EXCELLENT CONDITION
$95
Complete with leather carrying case and sling

Universal, 6 x 30 Navy Prism Binoculars, used but in excellent condition, complete with leather case and sling straps. $42.50 with Coated Optics, $10 Extra.

Engineers All Metal Army Type Hand-Sighting
LEVELS
$2.00 PRECISION QUALITY

Send $1.25 for 3rd Edition of Gun Digest with our complete catalog of new and used guns, etc. Our separate catalog 25c.

PUBLIC SPORT SHOPS
11 S. 16th St., Phila. 2, Pa. No COD's

VENETIAN BLIND
MACHINERY and EQUIPMENT
Write us for our Catalog
WRIGHT SALES CO., INC.
9601 Carr Ave. • Cleveland 8, Ohio

Get that NEW-CAR FEEL again!
SEALED POWER PISTON RINGS
The only ring with the Full-Flow Spring!
SEALED POWER CORP., DEPT..H2, MUSKEGON, MICH.

Beaconlite Illuminated $5.95
Streamline, $3.95
AT YOUR DEALER'S.
Write for illustrated literature.

HULL MFG. CO., P. O. BOX 246-E2, Warren, Ohio

SURPLUS
SPUR GEAR HAND
HOIST

LIFTS, as a hoist...or pulls, as a winch. Hundreds of uses for this converted bomb hoist. Made by famous manufacturer for Uncle Sam . . . Brand new, unused.
Easily lifts or pulls up to 350 pounds. 20 ft. of multi-strand wire rope can be fed out of any one of three drum housing openings.
Rig it up yourself on wall, beam, tripod or trolley, wherever you want to lift or pull heavy or bulky loads, such as boats, outboards, stock . . . anything too heavy to handle. Free illustrated "How To Use It" suggestions.

•

LIMITED QUANTITY
at never-again price of:
$9.95
Postpaid in U.S.A.

IRELAND & VICE P. O. Box 146-B, Auburn, N. Y.

If you're interested in a steady income — a substantial share of financial security for you and your family — you'll get in on the ground floor of this flourishing industry. Build a lucrative business of your own **NOW** with TRADIO, the radio functionally-designed for coin operation in hotels, hospitals, tourist camps, etc. Others like yourself all over the country are finding it a natural for big earnings. TRADIO has pioneered in this profitable postwar industry. **Today, there are more TRADIOS installed throughout the country than any other coin radio.**

Send for complete *information*. *WRITE: Dept. O-2*

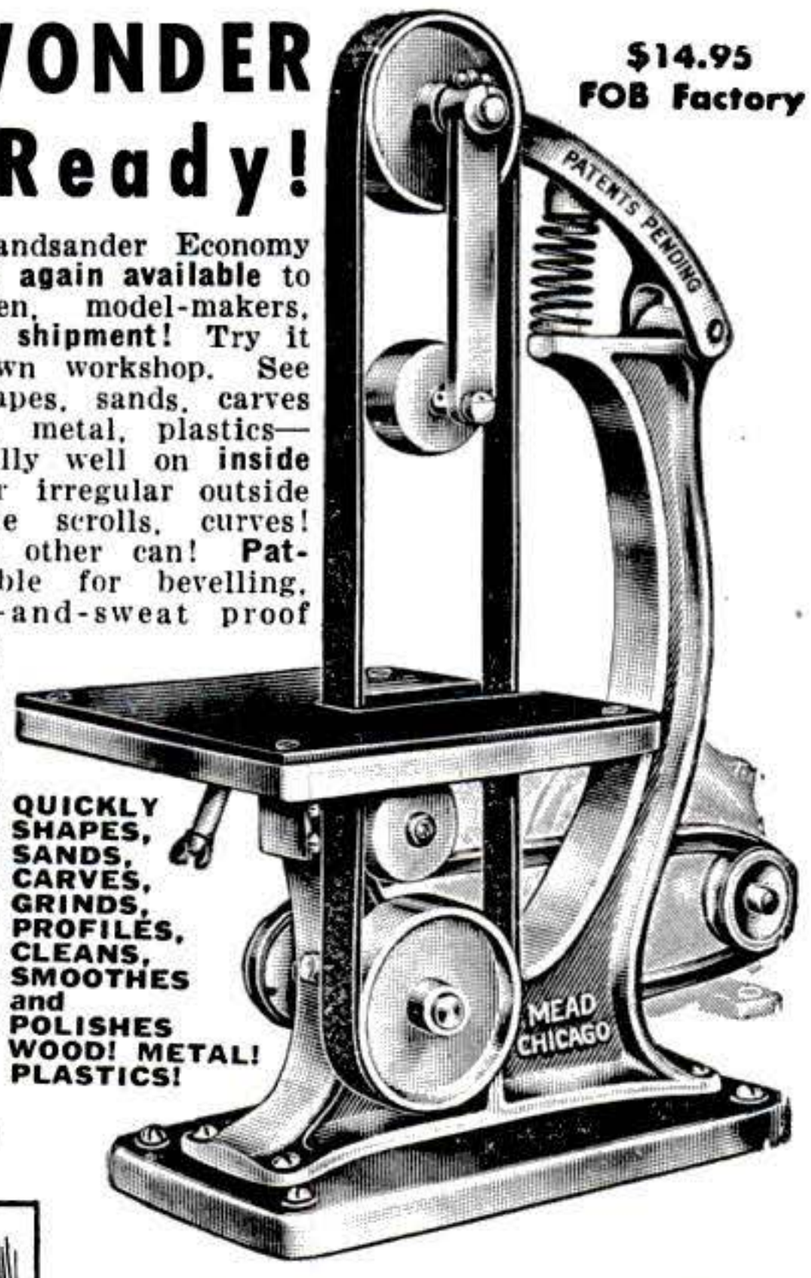
TRADIO, Inc. ASBURY PARK NEW JERSEY

Copyrighted material

5 DAYS TRIAL!

NEW WONDER TOOL Ready!

$14.95 FOB Factory



The remarkable Bandsander Economy Homeshop Model is **again available** to hobbyists, craftsmen, model-makers, etc. for **immediate shipment!** Try it 5 days in your own workshop. See how it quickly shapes, sands, carves and polishes wood, metal, plastics—how it works equally well on **inside** cut-out openings or irregular outside edges, on intricate scrolls, curves! Gets at places no other can! **Patented.** Tilting table for bevelling, chamfering. Rust-and-sweat proof top. Self-oiling sleeve bearings. Saves time, labor, money. Normal band speed 1600 feet per min. gives fast, clean, smooth cuts. ¼-h.p. 1725 rpm motor recommended. **Rush** only $14.95 with Bandsander order — or $5, balance COD, 5 Days' Trial. Money Back Guarantee. Limited supply, **so hurry! (Dealers write.)**

QUICKLY SHAPES, SANDS, CARVES, GRINDS, PROFILES, CLEANS, SMOOTHES and POLISHES WOOD! METAL! PLASTICS!

ORDER NOW or Circular FREE!

Order—or write for details on "the machine that amazed the experts!" Send postal NOW.

MEAD SPECIALTIES CO.

4114 N. Knox Ave., Dept. 228, Chicago 41, Ill.

If you make things or fix things, this unique tool will utterly astound you!

It's a PLIER
It's a WRENCH
It's a CLAMP
It's a VISE
It's a . . .
WONDER!

Serves as a plier — or the jaws can be locked, so hand pressure can be released and tool used as a vise. Swivel jaw holds objects of all shapes with terrific grip. Pressed steel body. Hardened (replaceable) jaws. ***Guaranteed.*** 10" size, $2.25; 7", $1.75. If not at your dealer's, order from us but give his name. Send for circular.

SEYMOUR SMITH & SON, INC.
900P Main Street — Oakville, Conn.

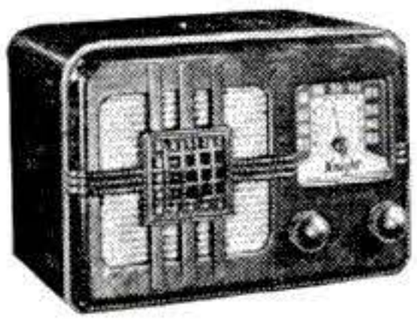
FREE!

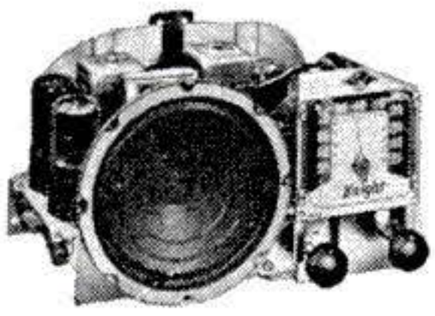
SEND FOR ALLIED'S BIG 164-PAGE RADIO CATALOG

Everything in Radio at Lowest Prices!

Here is *everything* you want in Radio! New home radios and phono-radios, Ham receivers and gear, new kits, thousands of parts, tubes, tools, complete PA equipment, diagrams, latest radio books. The most complete stocks anywhere—in one *big* book—all at money-saving low prices!

BUILD THIS AMAZING 5 TUBE RADIO





LOW-COST SUPERHET KIT
Complete with Plastic Cabinet, Loop Antenna, and Tubes

It's here! The first ultra-modern 5 Tube AC-DC Superhet kit at so low a price! Here's what you get—full broadcast band coverage (550-1600 Kc); built-in loop antenna; latest 5" PM dynamic speaker; handsome walnut plastic cabinet. Unbelievably easy to build; no special tools required. Sockets are riveted in place on chassis base; just assemble, wire and slip into cabinet. Outstanding for power and tone quality. Highest grade components only. Complete with all parts, tubes and full instructions. Nothing like it at the price! Shpg. wt., 10 lbs. **ONLY $14.95**
No. 83-275. Complete . . . . . .

GET THESE VALUABLE *ALLIED* RADIO BOOKS!

Radio Formulas & Data No. 37-752 . . . . 10c
Dictionary of Radio Terms No. 37-751 . . 15c
Radio Circuit Handbook No. 37-753 . . . . . 25c
Radio Builders' Handbook No. 37-750 . . 15c
Simplified Radio Servicing No. 37-755 . . . 10c
Radio Data Handbook No. 37-754 . . . . . 25c
ALL 6 BOOKS above No. 37-799 . . . . . $1.00
Parallel Resistance and Series Capacitance Calculator. No. 37-960 . . . . 25c
R-F Resonance and Coil Winding Calculator. No. 37-955 . . . . . 25c

ALLIED RADIO

ALLIED RADIO CORP.
833 W. Jackson Blvd., Dept. 7-B-8
Chicago 7, Ill.

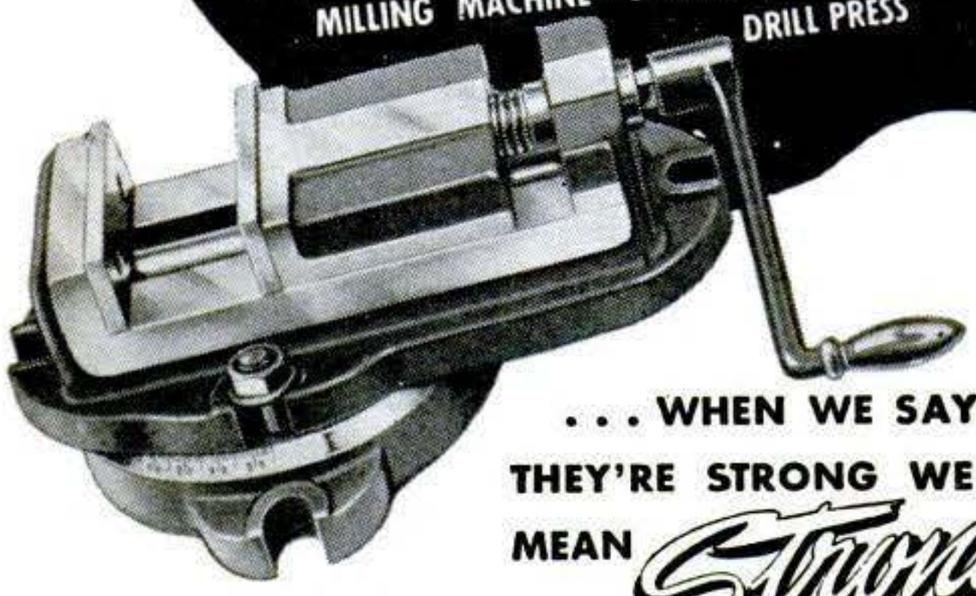
FREE CATALOG

☐ Rush FREE 164-page Catalog
☐ Send Kit No. 83-275
☐ Send 6 Books No. 37-799
☐ Send Calculators checked above
} $. . . . . enclosed

Name . . . . . .
Address . . . . . .
City . . . . . *Zone* . . . . . *State* . . . . . .

Copyrighted material

ANNOUNCING THE NEW
3" HUSKY VISE
SWIVEL BASE SUITABLE FOR
MILLING MACHINE – SHAPER – GRINDER
DRILL PRESS



. . . WHEN WE SAY THEY'RE STRONG WE MEAN *Strong!*

- Graduated base — can be used plain or swivel
- Width of Jaws 3"
- Depth of Jaws 1"
- Opens with steel jaws 2" (hardened)
- Weight complete with crank 16 lbs.

Our modern production facilities enable us to produce hi-quality machine tool equipment at the lowest prices.

- Large Acme steel screw contributes sturdiness and durability
- Four bolt and key slots are provided to attach the vise rigidly to the machine table so that work holding surfaces are at true right angles to the table.

$16.95

ORDER TODAY *or write for complete catalog*

MFGRS. UNIVERSAL AND INDEPENDENT LATHE CHUCKS • MILLING MACHINE VISES • POWER HACK SAWS • DIVIDING HEADS • MAGNETIC CHUCKS • RECTIFIERS • DEMAGNETIZERS

L.W. CHUCK CO., 32 So. St. Clair St., Toledo 4, Ohio

...USE THIS COUPON FOR YOUR CONVENIENCE...

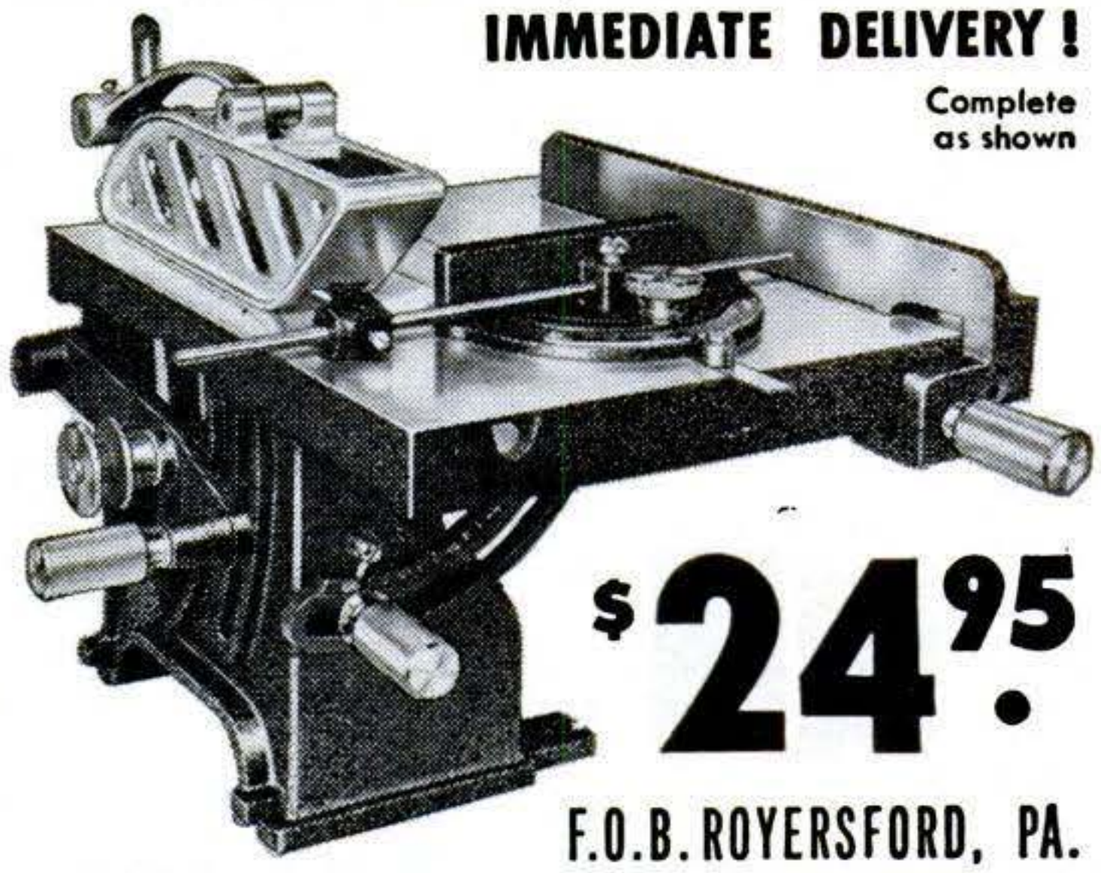
L. W. CHUCK CO.
32 SOUTH ST. CLAIR ST.
TOLEDO 4, OHIO

☐ Please ship one 3" Vise. Check or money order enclosed.
☐ Please send complete L-W Catalog.

NAME _____
STREET _____
CITY _____ STATE _____

IMMEDIATE DELIVERY!

Complete as shown



$24.95

F.O.B. ROYERSFORD, PA.

QUALITY 8" BENCH SAW

CUTS THROUGH 2 5/16"

UNCONDITIONALLY GUARANTEED ONE YEAR

(Write for Free Booklet and Guarantee Bond)

Comes complete with Floating motor mount—miter gauge with adjustable stop—aluminum guard—soft aluminum insert—spring steel splitter—heavy gray iron fence—(no motor—no blade). Table 12" x 14". Tilts to 45°—Oilite bearings. Shipping Wt. 50 lbs.

AMERICAN MACHINE & TOOL CO. Inc.
DEPT. 200 ROYERSFORD, PA.

A BIG 25¢ WORTH OF TOOL TIPS

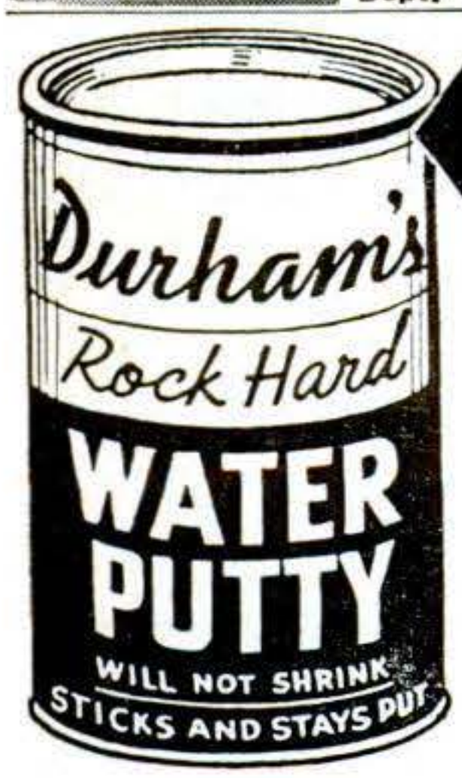
● Everything about tools . . . at a glance. More than 2000 views of boring and cutting tools, squares, gauges, jigs, etc. Years of tool experience in one, low-priced book . . . 25¢ postpaid. Write today. Stanley Tools 228 Elm St., New Britain, Connecticut.

STANLEY
Reg. U.S. Pat. Off.

REAL GAS ENGINE $6.95

The new THOR "B"—Sensational miniature gasoline engine that **really** works. Super-power performance. Smooth, velveted power that roars into action with a "twist of the wrist." Over 25,000 already sold. 1/6 H.P. Complete with coil and condenser. Ready to run, only $9.95. In KIT form, fully machined, 5 minutes to assemble, $6.95, without coil and condenser. Powers all models. Fully illustrated instructions. Send $1.00—shipped collect same day C.O.D. **FREE.** Send for 24-page Illustrated Hobby Catalog.

AMERICA'S HOBBY CENTER
Dept. S-28, 156 W. 22nd St., N. Y. 11



The Modern PLASTIC for lasting Home Repairs

PERMANENTLY mends cracks or holes in wood, tile, stone or plaster. Sticks and stays put—Does not chip, shrink or fall out. Easy to use. Economical. Mold it, chisel it, polish or paint it. If unobtainable from your lumber, paint or hardware dealer, the big 4-lb. can will be sent you postpaid (in U.S.) for only $1. Full money-back guarantee, order now.

DONALD DURHAM CO.
Box 804-N, Des Moines, Iowa

Nimrod
PIPELITER

$3.50 AT YOUR DEALER

- WINDPROOF
- LIGHTWEIGHT
- LARGE FLAME

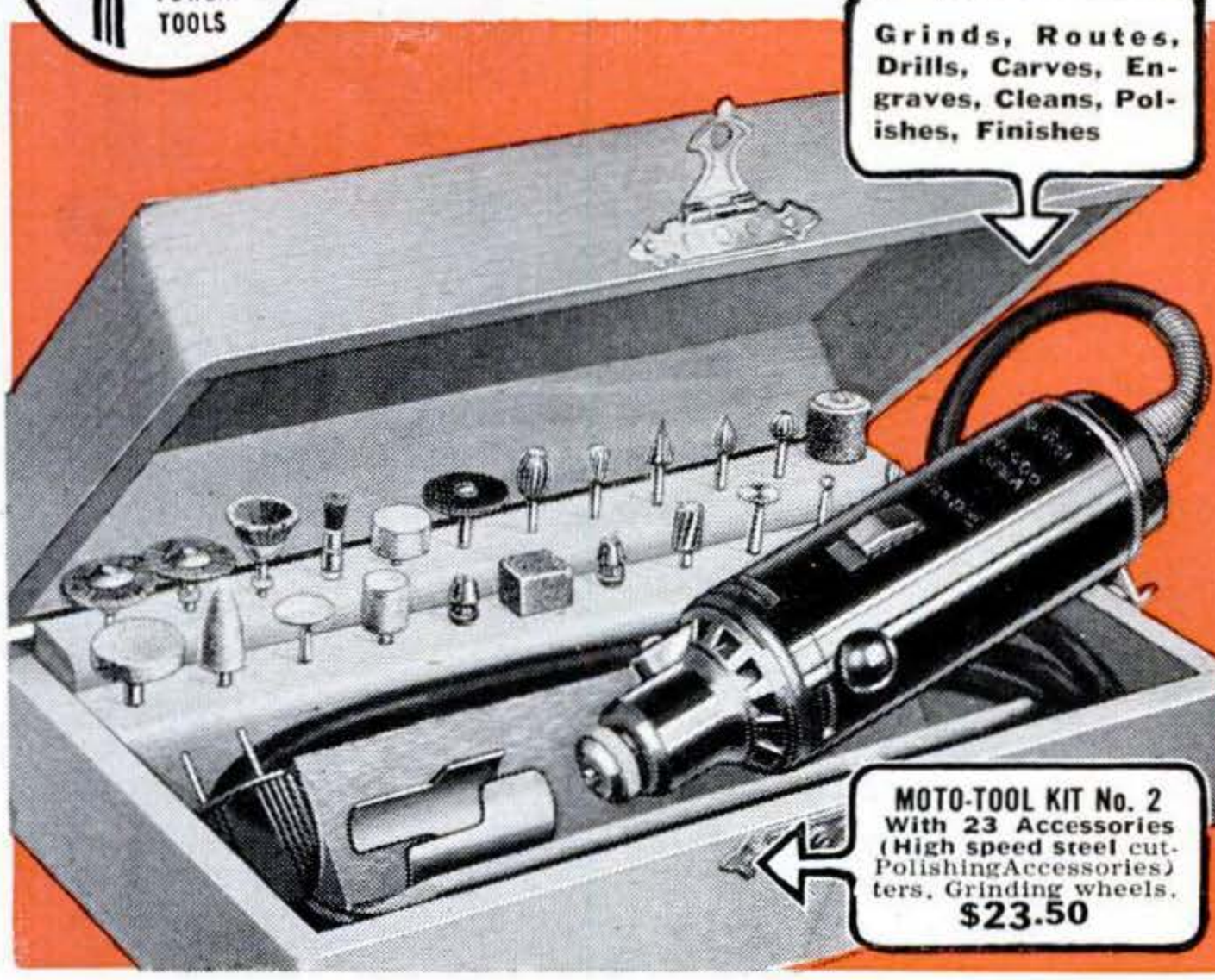
Unconditionally Guaranteed

Copyrighted material

ELECTRIC DREMEL POWER TOOLS

Moto-Tool THE "POCKET-SIZE MACHINE SHOP"

A TESTED TOOL THAT PACKS YEARS OF PLEASURE



MOTO-TOOL No. 2
WITH EMERY POINT
$16.50

MOTO-TOOLS have the Right Speed for efficient operation. Approximately 27,000 R.P.M.
CUTS CLEANER—SAVES CUTTERS

If you get a kick out of making things, you'll want a Moto-Tool . . . it does work better, faster . . . on practically any material. High speed plus dynamically balanced armature provides vibrationless finger-tip control. As a "War Veteran", Moto-Tool served in every branch of the Armed Forces. Compare Moto-Tool with other grinders and see for yourself why it's better.

MONEY-BACK GUARANTEE

Buy Dremel Moto-Tool from your dealer. If he cannot supply you, use coupon below to order on 10 day trial, money-back guarantee. Shipped postpaid for payment in full (send check or money order); or send only $2, we will ship C.O.D. You pay postman balance plus postage.

DREMEL MFG. CO., Dept. 128-B, Racine, Wis.

14 REASONS WHY MOTO-TOOL IS A BETTER BUY

- Patented automatic chuck lock pin.
- Instant-action, wrenchless chuck.
- Oil-less, sealed, trouble-proof bearings.
- Oversize armature shaft, hardened, ground and polished.
- 110-volt, universal type motor.
- Easily replaced commutator brushes.
- Dust-filtered air-cooling system.
- About 27,000 R.P.M. Cuts cleaner . . . saves cutters.
- Sturdy, shock-proof bakelite housing.
- Housing has "pencil-type" finger grip.
- Sliding snap type switch.
- Handy hanger hook; cord protector.
- Weighs only 13 oz. . . . shaped to fit the hand.
- Dynamically balanced for vibrationless operation.

HERE'S BIG VALUE

MODEL No. 1
MOTO-TOOL KIT
ONLY
$17.50

This highly popular Kit contains Model No. 1 Moto-Tool and 34 practical accessories in attractive, lacquer-finish wood box. It's the biggest bargain in the field.

New . . . . .

DREMEL DRILL PRESS
ONLY $9.95

(LESS DREMEL MOTO-TOOL)

Owners of Moto-Tools will find the new Dremel precision Drill Press indispensable for handling fine work such as creating costume jewelry, model making, wood carving, routing, etc. Sturdy tool clamp accommodates Model No. 2 Moto-Tool. Power unit can be raised or lowered, swung in any direction or quickly removed for regular off-hand use in a few seconds.

IF YOUR DEALER CANNOT SUPPLY YOU *USE THIS COUPON TO ORDER*

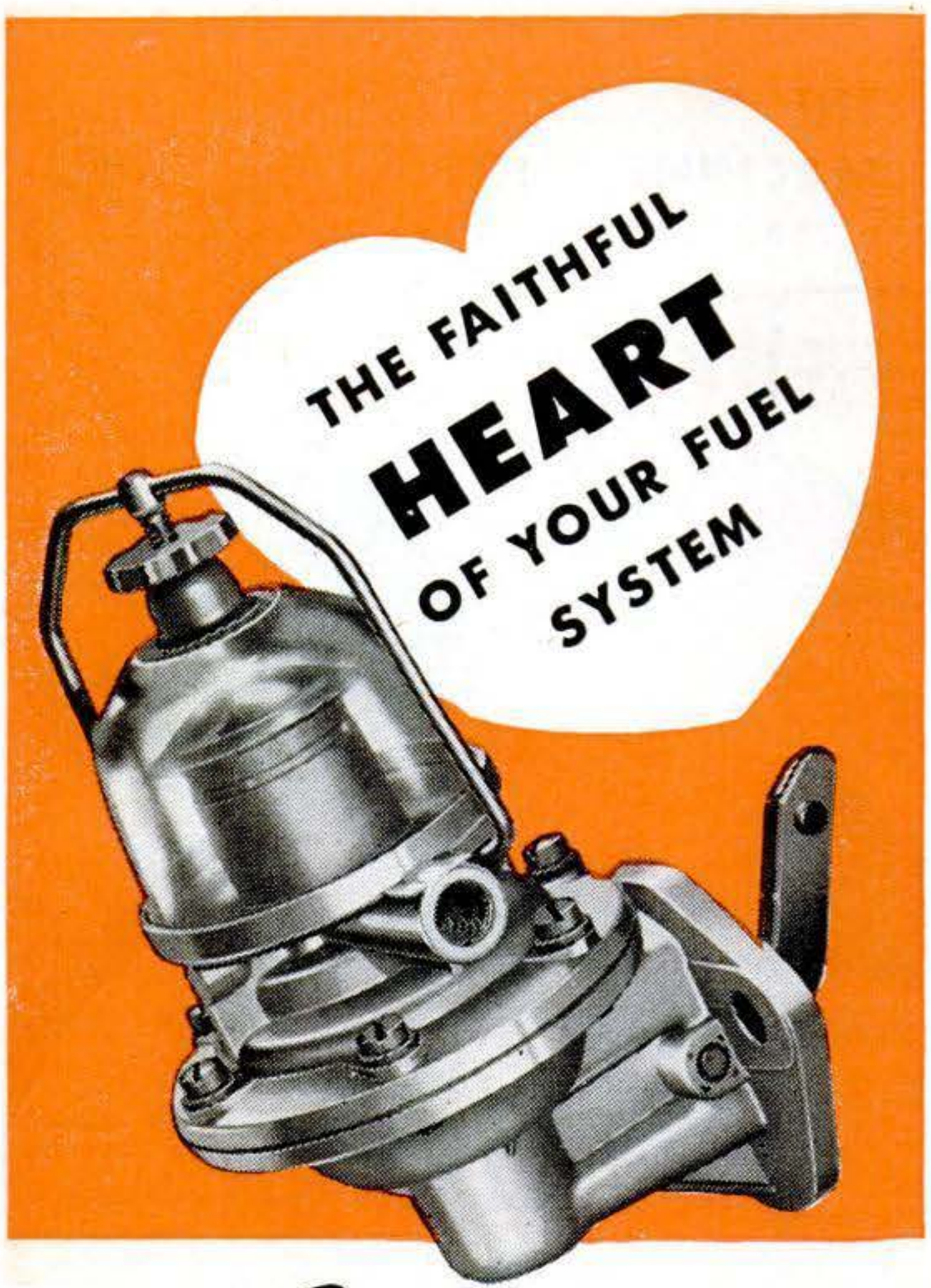
DREMEL MANUFACTURING COMPANY • DEPT. 128-B • RACINE, WISCONSIN

☐ Enclosed find $..... (Check or money order in full). Ship items checked below at once Postpaid.
☐ Enclosed find $2.00 as part payment on items checked. I will pay postman balance plus postage upon delivery.

☐ Moto-Tool Kit No. 2 $23.50
☐ Model 1 Moto-Tool $9.85
☐ Model 2 Moto-Tool $16.50
☐ Dremel Drill Press (Less Moto-Tool) $9.95
☐ Moto-Tool Kit No. 1 $17.50
☐ Free Catalog of Dremel Tools and Equipment.

Name.....Address.....City.....State.....

Copyrighted material



OVER 30,000,000 IN USE TODAY

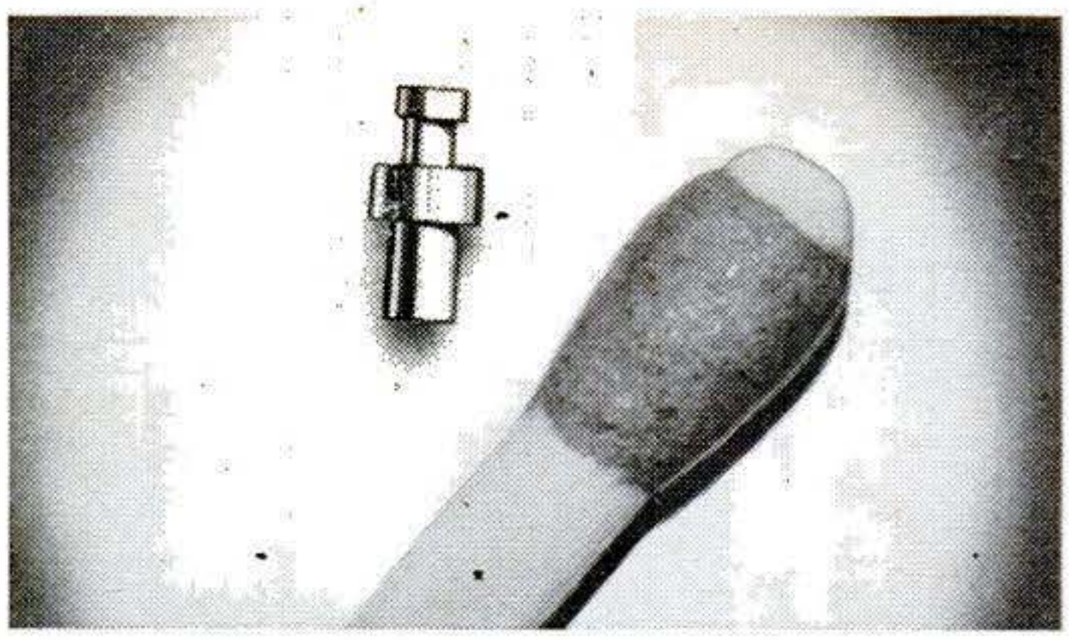
Pulsing steadily, nearly 100,000 times an hour, your AC Fuel Pump is the strong, reliable heart of your fuel system. It has given you long, faithful service because of its inbuilt quality and scientific design.

You can prolong that faithful service indefinitely, if you insist upon a new AC when you replace your present pump.

There is no satisfactory substitute for quality.

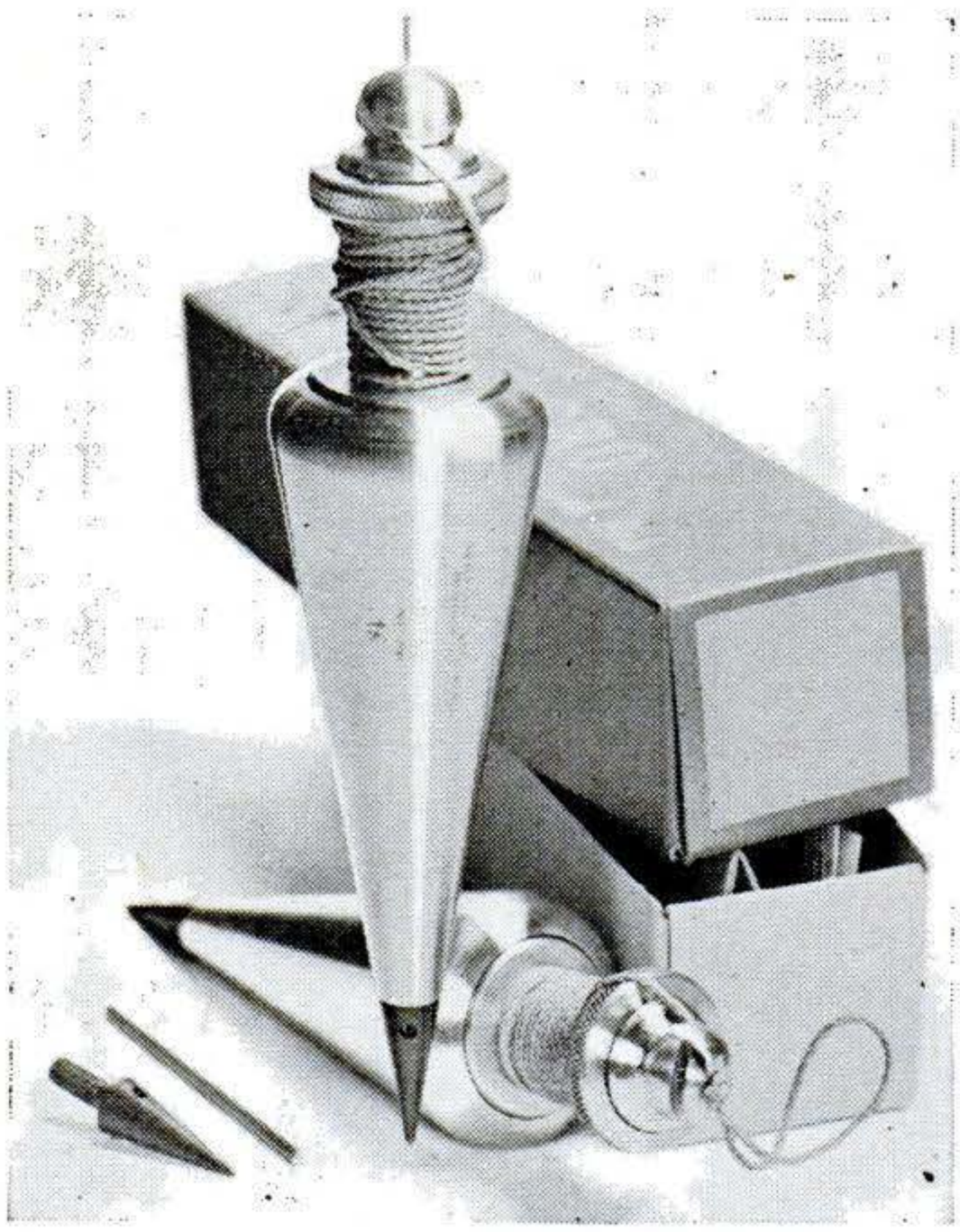
AC Fuel Pumps

AC SPARK PLUG DIVISION • GENERAL MOTORS CORPORATION



Smallest Machined Lug

DWARFED by a matchhead, this miniature terminal lug is said to be the smallest machined lug in existence. It projects only 3/32 inch above a mounting board. Designed for use in miniature radios, hearing aids, meters and microphones, the Mini-Lug is marketed by the Cambridge Thermionic Corp., of Cambridge, Mass.



Hook Fixes Plumb Bob

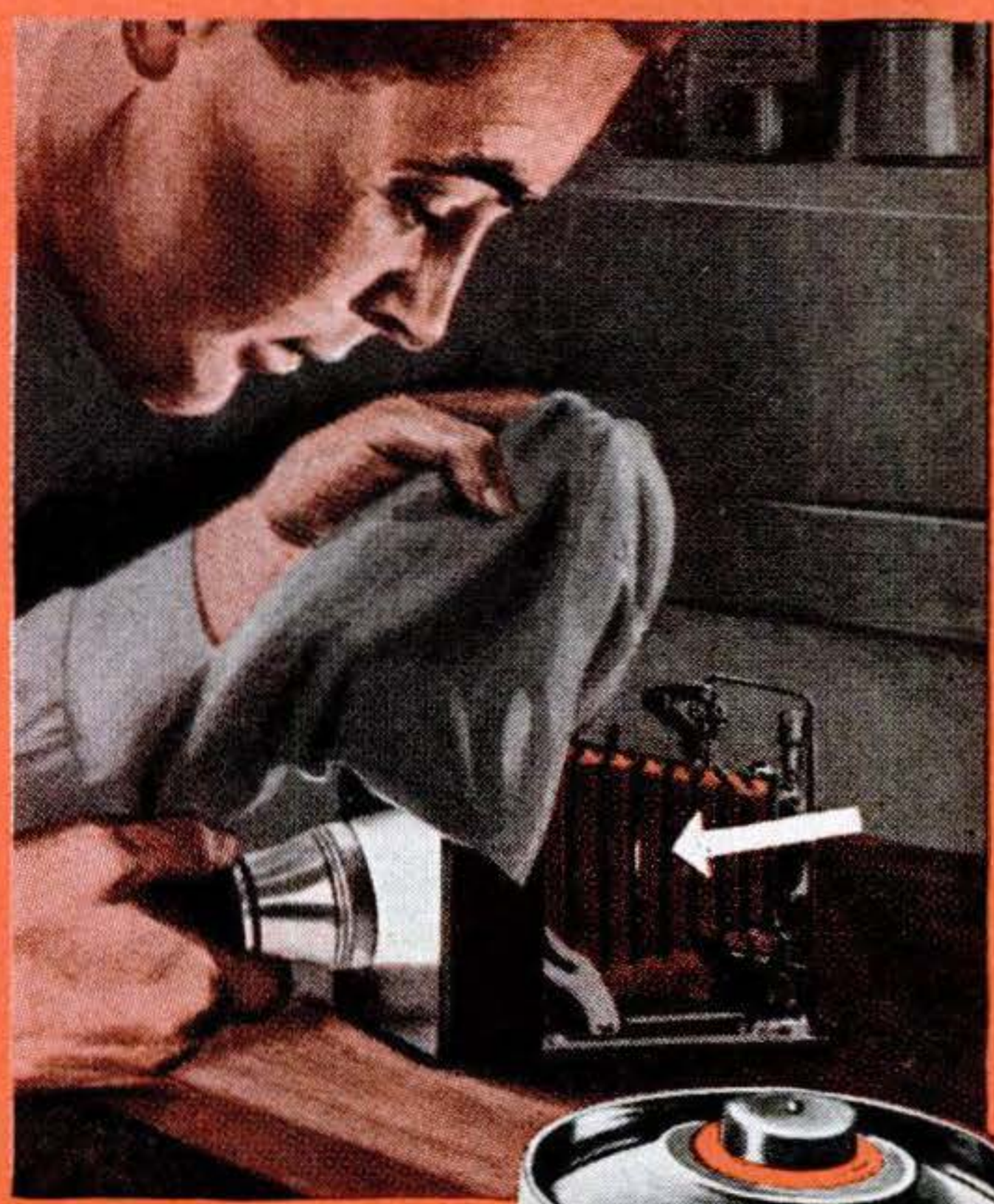
PROVING that even the simplest tool can be refined, here's a Rolls-Royce version of the plumb bob. The Micro Bob is fitted with a rotatable reel and a special hook on top of the neck. When enough cord has been reeled off, it is slipped onto the hook, which holds the bob exactly in place anywhere on the cord. For fine adjustments, the spool is rotated.

Copyrighted material

HOW TO KEEP *LIGHT STREAKS* OUT OF YOUR SNAPSHOTS

SO YOU did it again. You were so sure this was going to be the best "shot" yet! But, no . . . it's just another snapshot full of light streaks. That indicates there may be holes in the bellows of your camera. There's an easy way to find out. Use your trusty flashlight. Better be sure your flashlight is powered with "Eveready" batteries. Powerful, dependable, *they outlast all other brands!**

GET OUT YOUR FLASHLIGHT. Take the back off your camera, as you do to put in new film. Then project the head of the flashlight just inside. The remaining exposed area of back should be covered with a cloth—the shutter should be closed. If you turn on the flashlight in a dark room, any holes in the bellows will be exposed immediately.



Proof . . . in the laboratory . . . in your own flashlight . . .

"EVEREADY" BATTERIES OUTLAST ALL OTHER BRANDS!*

Brighter light, longer life! That's what you want in a flashlight battery—and that's what you get with "Eveready" brand batteries. Laboratory tests prove it. And the best "laboratory" of all—*your own flashlight*—proves it! That's why "Eveready" batteries *outsell* all other brands—because they *outlast* all other brands!*

The registered trade-mark "Eveready" distinguishes products of
NATIONAL CARBON COMPANY, INC.
30 East 42nd Street, New York 17, N. Y.
Unit of Union Carbide UCC *and Carbon Corporation*

**According to the "General-Purpose 4-Ohm Intermittent Test" of the American Standards Association, which most closely approximates average use.*

Copyrighted material

SEE IT TODAY!

EVERY FEATURE YOU WANT FOR FINE WORKMANSHIP

NEW Atlas 10" TILT/ARBOR FLOOR SAW

Send for Free Illustrated Bulletin

ATLAS PRESS COMPANY
255 N. Pitcher St., Kalamazoo 13D, Mich.

Please send me free illustrated bulletin on the new Atlas 10" Tilt/Arbor Floor Saw.

Name_____

Address_____

City_____ State_____

CHECK THIS NEW ATLAS SAW — inside and out — see everything *you* would specify in a made-to-order machine! It's a natural for cabinet makers, builders, lumber yards, manufacturers, and home workshops . . . built with metal-working tool precision for easier, *more accurate* sawing . . . with ruggedness to stand the gaff of steady, heavy-duty work. Examine its big table: 27½" x 27½", with 13¼" working surface ahead of the blade. Note the precision ball bearings for *permanent smoothness*. Go over the new-type rip fence — *self-squaring*, locks rigidly at *both* ends, *releases instantly* for positioning or removal — nothing else like it! This new Atlas is the last word in saw engineering — built for years of dependable service. Ask your Atlas distributor, or send for illustrated bulletin.

ATLAS PRESS CO.

255 N. Pitcher St. • Kalamazoo 13D, Michigan

Copyrighted material

Free CONCORD RADIO CATALOG

LOWEST PRICES on Everything in
RADIO · TELEVISION · RADAR
ELECTRONIC EQUIPMENT

- Thousands of items—parts, supplies and equipment—for every Radio and Electronic need.
- Special Bargains—hundreds of money-saving values in top quality Radio Parts.
- Immediate delivery from big complete stocks at Chicago and Atlanta.

MAIL COUPON FOR FREE COPY

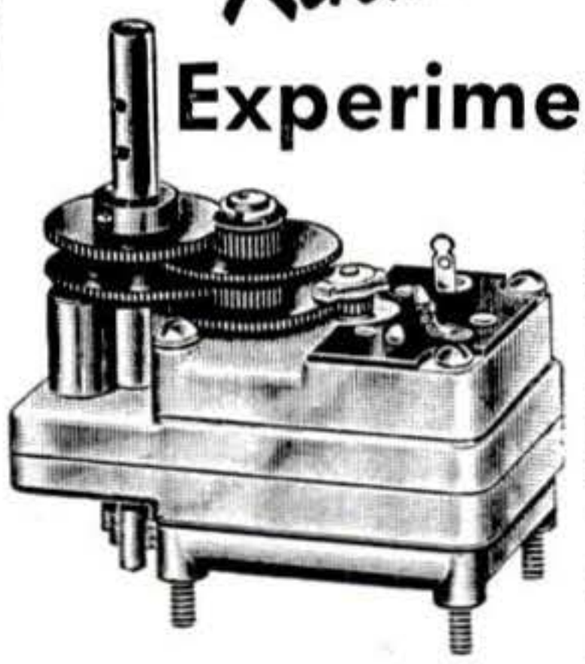
CONCORD
RADIO CORPORATION

CHICAGO 7
901 W. Jackson Blvd.

ATLANTA 3
265 Peachtree St.

Downtown Chicago Branch: 229 W. Madison St.
Lafayette Radio Corp.

A Few of the Thousands of Great Money-Saving Buys in this 160-Page Radio Catalog!



Experimenters Motor

Compact induction type AC motor operates from 25 to 30 volts AC, 60 cyc. Motor speed 2400 rpm with gear train driving ¼" shaft at 24 rpm. Thermal cutout prevents overload damage to motor. Measures 2x1¾"x3", excluding shaft which is ¼" dia, extending 2⅞". **C14699**..... **$2.50**

5-Tube AC-DC Kit

Five-tube AC-DC superheterodyne. Includes automatic volume control, true tone reproduction. Streamlined airplane dial, wide tuning that covers 550 to 1600 KC, built in loop antenna and Alnico V speaker. Cabinet is beautiful brown plastic. Kit contains all parts to build complete receiver.
C24456—With cabinet and tubes..... **$13.75**

Wireless Microphone

Talk through your radio with no connecting wires! Tuning by means of knob at side assures a clear channel. Covers 1000 to 1700 KC. Entirely self contained with power supplied by one flash light cell and a Minimax "B" battery. Extremely small drain due to use of single 1L4 tube. 6¾" high, 5¼" deep, 5" base. With batteries and tube. **$6.63**
C22548.....

Crystal Pickup

Quality crystal pickup mounted in arm for 10' and 12" records. Mounting included. Requires ½" hole. Shielded lead and cartridge case. Aluminum die cast arm finished in smooth dark brown. With semi-permanent needle. **$1.59**
X143.....

Even-Speed Phono-Motor

Model 80. Rim-drive phono motor. 9" turntable. Constant speed (78 r.p.m.) self-starting, forced draft air-cooled. For 10" and 12" records. 110 V. 60 cycles only. Wt. 4 lbs. **$2.69**
X182.....

Concord Radio Corporation, Dept. PS-28,
901 W. Jackson Blvd., Chicago 7, Ill.

Yes, rush FREE COPY of the comprehensive new Concord Radio Catalog.

Name.....

Address.....

City.....State.....

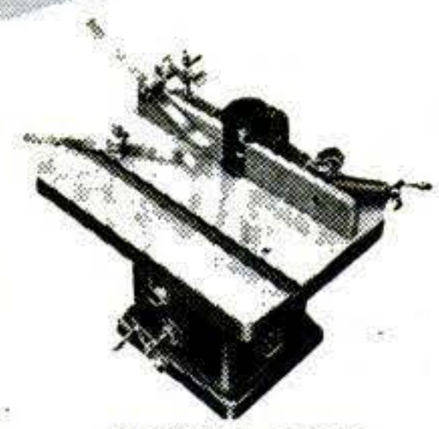
Copyrighted material

"Factory" at your Fingertips

NEW POWER KING 8" TILT/ARBOR TABLE SAW

This new Power King saw in your shop is like adding the services of a highly skilled helper. It's versatile, *dependably accurate* . . . 10 times faster than tiresome hand sawing . . . greatly increases the number of cabinets, shelves, furniture, and other valuable articles you can make quickly, easily, *and at low cost.*

The new Power King 8" table saw has an extra-large (18" x 20"), precision-ground table. Blade *tilts* — table and work stay flat — for greater accuracy and safety. Saw cuts 2⅝" deep. Rigid, *double-locking* rip fence *releases instantly* for positioning on either side of blade. Sealed precision ball bearings for permanent smooth operation. It's America's outstanding saw value! Send for literature and name of nearest dealer today.



POWER KING SPINDLE SHAPER

POWER KING JOINTER-PLANER

POWER KING 12" DRILL PRESS

POWER KING TOOL CORP.

235 Cleveland St.
Warsaw, Ind.
Division of
Atlas Press Co.

POWER KING

SEND FOR FREE LITERATURE TODAY

POWER KING TOOL CORP.
235 Cleveland St., Warsaw, Ind.
Please send new Power King catalog sheets to:

Name_____

Address_____

City_____ State_____

Drainboard Aids Drying

A STAINLESS metal drainboard, stamped in a closely ridged pattern, keeps glassware from sliding or toppling while allowing air to circulate underneath for drying. Rigid-Tex Corp., of Buffalo, N. Y., is the maker.

Tool Carves Grapefruit

PREPARING grapefruit is made easier by the stainless steel tool shown above. Its 10 blades divide the fruit into sections, a knife-edged center tube cuts out the core, and an adjustable blade severs the fruit from the rind. The utensil is made by the Special Products Co., of Silver Spring, Md.

Copyrighted material

YEARS AHEAD IN DESIGN • PERFORMANCE • FEATURES

One glance tells you there's a brilliant new leader in the light motor field . . . one run, *and you know it's true!* You thrill to power that is incredibly smooth, flexible, quiet! You enjoy sparkling new features that give you an entirely new conception of light motor performance, convenience, handling ease! Here is the fuel gauge you've always wanted . . . and a score of other advancements including the amazing *Weedless Drive* that lets you highball through waters closed to other motors . . . gives you the all-clear through thick weeds and over rocks, snags, reefs . . . drives anywhere there is water to float your boat!

See Your Evinrude Dealer! Examine the new Sportwin and the complete Evinrude line for '48. Six great Evinrudes to choose from — three famed four-cylinder models — the right motor for every boat. Look for your dealer's name in your phone book under "Outboard Motors." Write for free catalog — address, EVINRUDE MOTORS, 5705 N. 27th Street, Milwaukee 9, Wis.

In Canada: Evinrude Motors, Peterboro, Ont.

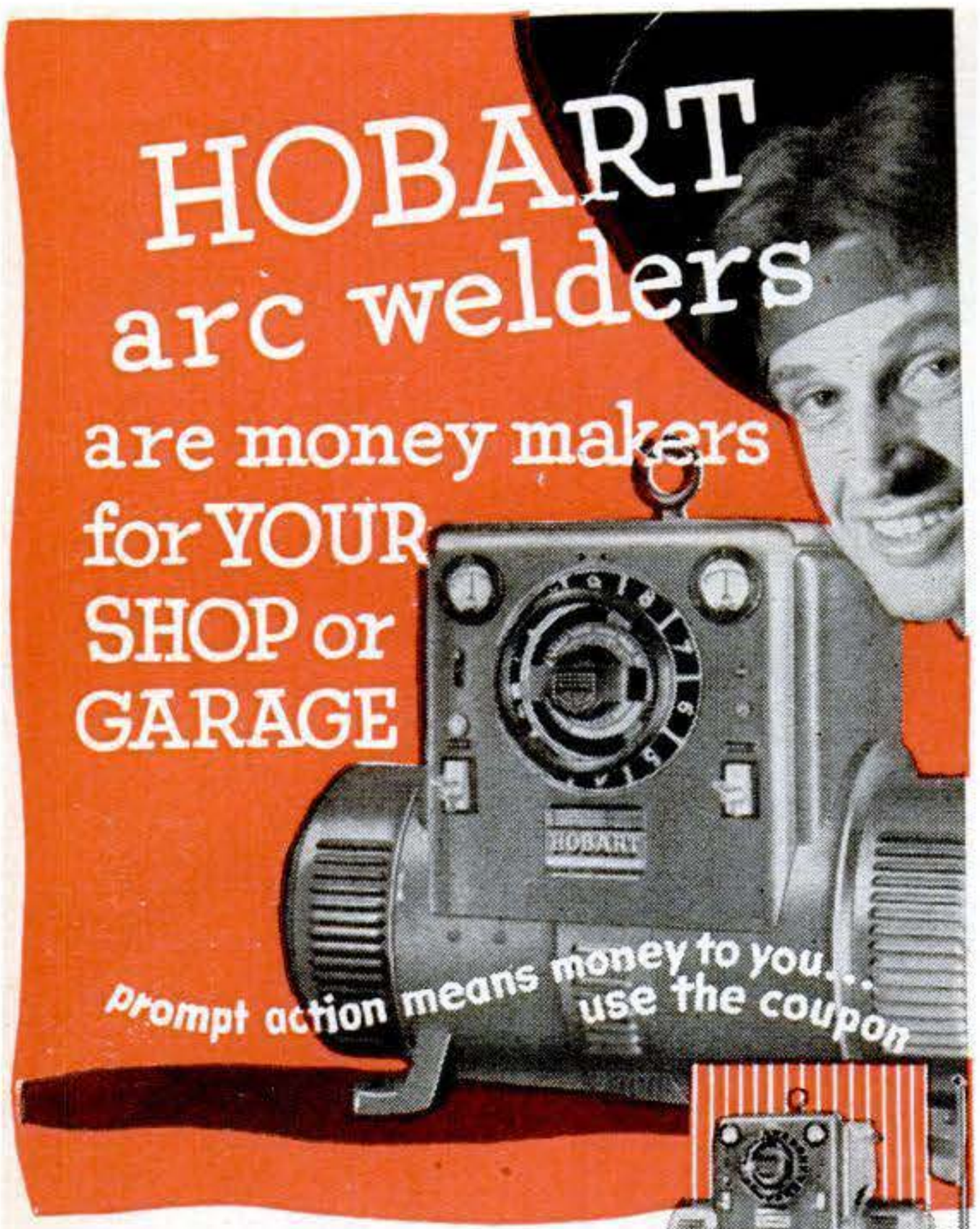
YOURS IN THE NEW SPORTWIN — these advancements, and many more • New alternate firing motor gives new flexibility and smoothness — 3.3 O.B.C. certified brake H.P. at 4000 R.P.M. • New type Simplex Starter • "Full View" fuel gauge • New developments in automatic operation • New type Fuel Filler Closure for faster, easier fueling. • New Transom Trigger for instant vertical adjustment • New type "Fore-and-Aft" carrying handles • Weedless Drive with rubber shock-cushioned propeller • 360° steering with full reverse.

FIRST IN OUTBOARDS ...39th YEAR **EVINRUDE**

Copyrighted material

HOBART arc welders

are money makers for YOUR SHOP or GARAGE

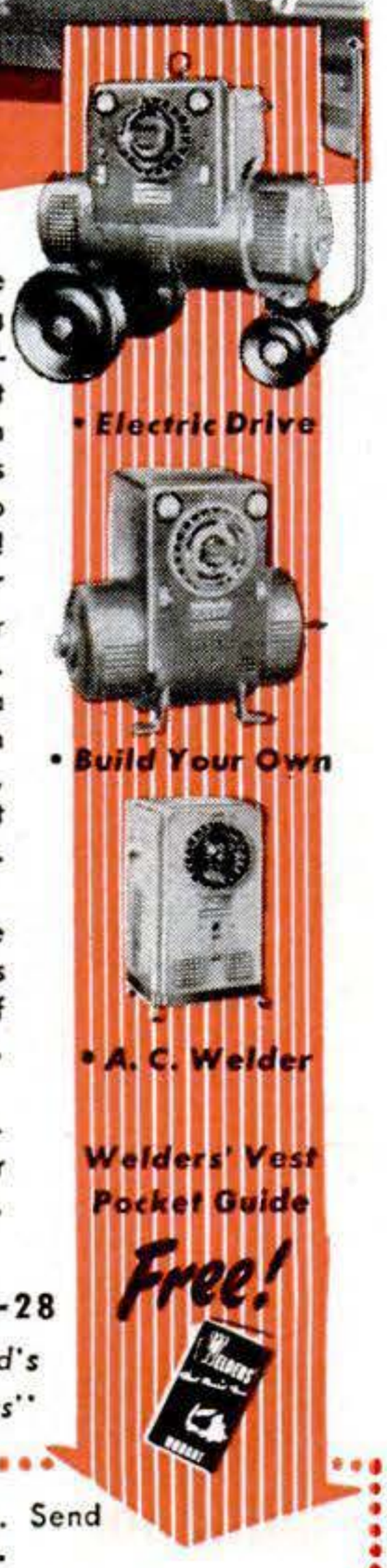


Start Your Own Business!
Here's your best opportunity to be your own boss and get into the big money! Start your own welding shop—minimum investment required. Hobart offers 1000 welding combinations with Multi-Range Control for better welds—Hobart's Remote Control speeds up work—makes you more profit!

You Can "Build Your Own" HOBART
Save hundreds of dollars, build your own gasoline drive Hobart arc welder. You need only a Hobart generator, a used auto engine and chassis. With this portable gasoline drive welder, you can go any place. Free booklet tells you how. Write for details.

The Finest A. C. Welder Ever Built
Hobart A. C. Arc Welder for single phase lines. Handles auto repairs economically — ideal for all types of light metal work. Use coupon for details.

HOBART WELDING SCHOOL
Individual instruction, expert instructors, low cost. Qualified under G. I. Bill of Rights.



Hobart Brothers Co., Box P-28
Troy, Ohio *"One of the World's Largest Builders of Arc Welders"*

I'm interested in Hobart Arc Welding. Send my free book, details on items checked.

☐ Gas Drive Welder ☐ Build Your Own
☐ A. C. Arc Welder ☐ Welding School

NAME_____

ADDRESS_____

_____

Hobart Bros. Co., Box P-28, Troy, Ohio

No other tool like it!

BURGESS vibro-tool

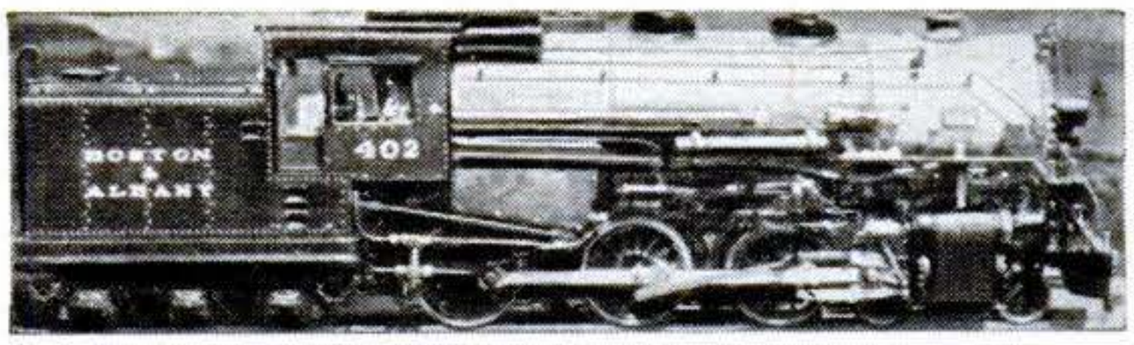
Trade Mark Reg U S Pat Off

Writes on . . .
Watches
Glassware
Tools
Leather
Plastics
Costume Jewelry
Pots and Pans
Sporting Equipment

Engrave your name . . . etch letters or designs . . . place permanent identification marks on anything with this unique hand tool. Carves wood and linoleum, cuts cardboard and balsa, tools leather. Just plug in on any 110 volt AC line No home shop is complete without a Burgess Vibro-Tool. See your dealer or write for information.

DELUXE KIT
Vibro-Tool complete with 22 attachments in handsome, polished wood chest $16.50

BURGESS Vibro-Tool Division
LAKE ZURICH, ILLINOIS



LIVE STEAMERS

Blue Prints and Castings on ¾" Scale for Six Engines

Tom Thumb — Pacific 4-6-2 — Atlantic 4-4-2 Tanker 4-6-6-T — New York Central Hudson 4-6-4 — Union Pacific Articulated 4-6-6-4 *Write for Price List*

YANKEE SHOP, Machinists 88 High Street, Danvers, Mass.

Thompson BEATS the World on BOATS

Better Built Lower Prices

Safe Boats With Full Length Spray Rails
Keep passengers perfectly dry—even at high speeds. Catalog also shows two new models of "Take-Along" Boats. Two big factories—save you freight.

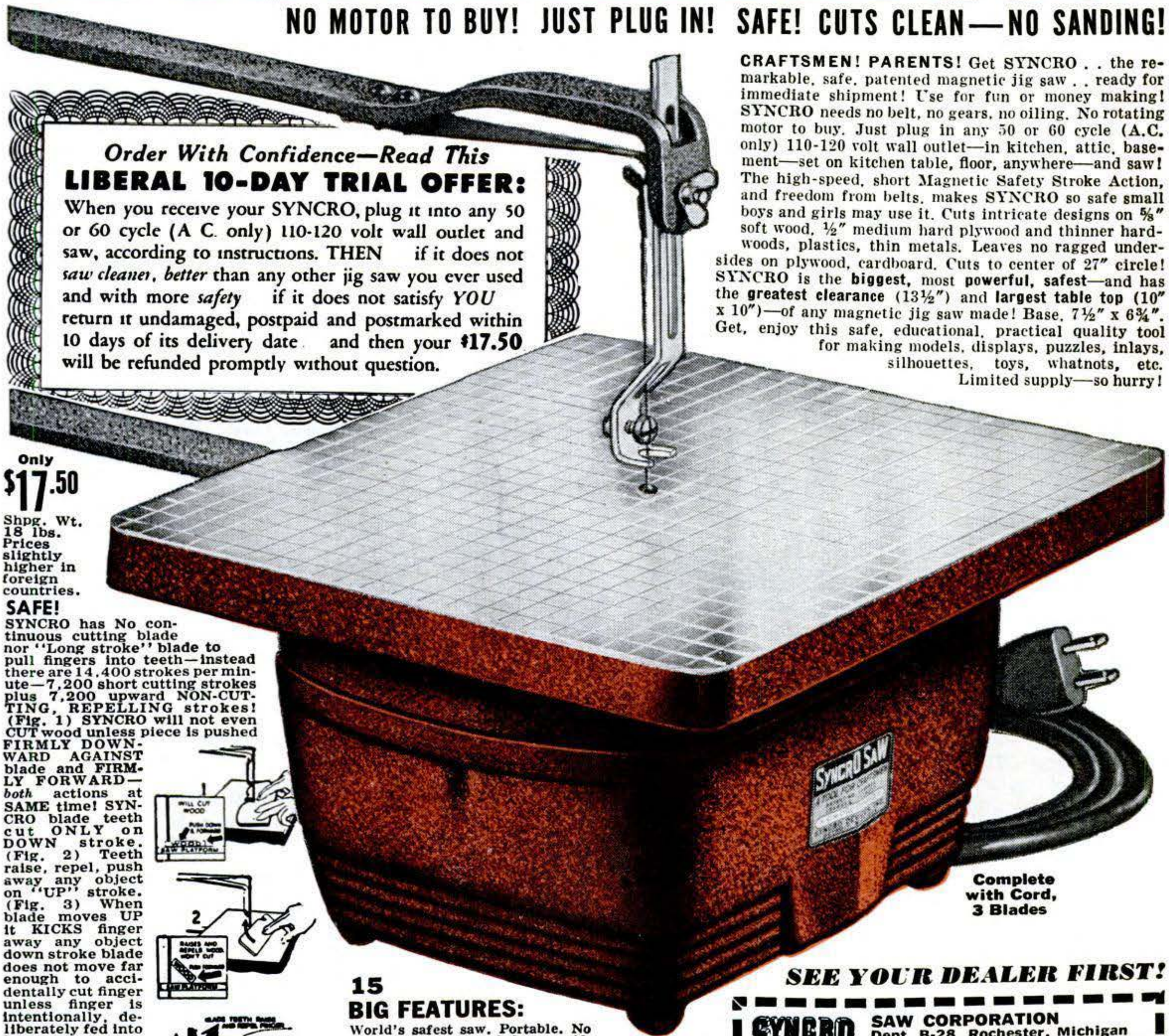
CATALOG FREE
Write for your copy. State kind of boat in which you are interested.

THOMPSON BROS. BOAT MFG. CO. (151)
219 Ann St. PESHTIGO, WIS. (*Write to either place*) 119 Elm St. CORTLAND, N.Y.

Copyrighted material

BIG FUN and PROFIT Using Amazing NEW JIG SAW!

NO MOTOR TO BUY! JUST PLUG IN! SAFE! CUTS CLEAN—NO SANDING!



Order With Confidence—Read This

LIBERAL 10-DAY TRIAL OFFER:

When you receive your SYNCRO, plug it into any 50 or 60 cycle (A C. only) 110-120 volt wall outlet and saw, according to instructions. THEN if it does not *saw cleaner, better* than any other jig saw you ever used and with more *safety* if it does not satisfy *YOU* return it undamaged, postpaid and postmarked within 10 days of its delivery date and then your **$17.50** will be refunded promptly without question.

CRAFTSMEN! PARENTS! Get SYNCRO . . the remarkable, safe, patented magnetic jig saw . . ready for immediate shipment! Use for fun or money making! SYNCRO needs no belt, no gears, no oiling. No rotating motor to buy. Just plug in any 50 or 60 cycle (A.C. only) 110-120 volt wall outlet—in kitchen, attic, basement—set on kitchen table, floor, anywhere—and saw! The high-speed, short Magnetic Safety Stroke Action, and freedom from belts, makes SYNCRO so safe small boys and girls may use it. Cuts intricate designs on ⅝" soft wood, ½" medium hard plywood and thinner hardwoods, plastics, thin metals. Leaves no ragged undersides on plywood, cardboard. Cuts to center of 27" circle! SYNCRO is the **biggest**, most **powerful, safest**—and has the **greatest clearance** (13½") and **largest table top** (10" x 10")—of any magnetic jig saw made! Base, 7½" x 6¾". Get, enjoy this safe, educational, practical quality tool for making models, displays, puzzles, inlays, silhouettes, toys, whatnots, etc. Limited supply—so hurry!

Only $17.50

Shpg. Wt. 18 lbs. Prices slightly higher in foreign countries.

SAFE!

SYNCRO has No continuous cutting blade nor "Long stroke" blade to pull fingers into teeth—instead there are 14,400 strokes per minute—7,200 short cutting strokes plus 7,200 upward NON-CUTTING, REPELLING strokes! (Fig. 1) SYNCRO will not even CUT wood unless piece is pushed FIRMLY DOWNWARD AGAINST blade and FIRMLY FORWARD—*both* actions at SAME time! SYNCRO blade teeth cut ONLY on DOWN stroke. (Fig. 2) Teeth raise, repel, push away any object on "UP" stroke. (Fig. 3) When blade moves UP it KICKS finger away any object down stroke blade does not move far enough to accidentally cut finger unless finger is intentionally, deliberately fed into blade like wood is fed in Figure 1. No wonder SYNCRO is the world's SAFEST saw . . . a feature old and young users acclaim!

15 BIG FEATURES:

World's safest saw. Portable. No rotating motor needed as self-contained magnetic power unit transmits A.C. magnetic impulses to armature diaphragm-power transferred to blade. No rotating parts to wear out. 14,400 magnetic strokes per minute. Never needs oiling. Large 10" x 10" table top. Cross section engraved lines on top. Big 13½" throat clearance. Finest steel blades. Rubber feet. 5' cable, plug. Varying voltage adjustment nut. Life-time, durability. Quality materials, workmanship, performance.

Complete with Cord, 3 Blades

SEE YOUR DEALER FIRST!

SYNCRO SAW CORPORATION
Dept. B-28, Rochester, Michigan
Export Address: 120 Wall St., N.Y.C.

Gentlemen: Here's my order for one SYNCRO MAGNETIC JIG SAW, Model No. 2000, shpg. wt. packed, 18 lbs. $17.50 FOB Factory. Please send it complete with electric cable and plug, 3 blades, on your 10 Days Money Back Trial Offer. I enclose $17.50 as payment. Please ship saw:

( ) Express charges collect or ( ) Parcel Post charges collect
( ) Express, for which I enclose an extra $.....
( ) Parcel Post, for which I enclose an extra $.....

NAME.....
ST. & NO.....
CITY.....STATE.....

( ) I enclose no money—
send FREE SYNCRO CIRCULAR.

AMERICA'S SAFE, BIGGEST SELLING JIG SAW!

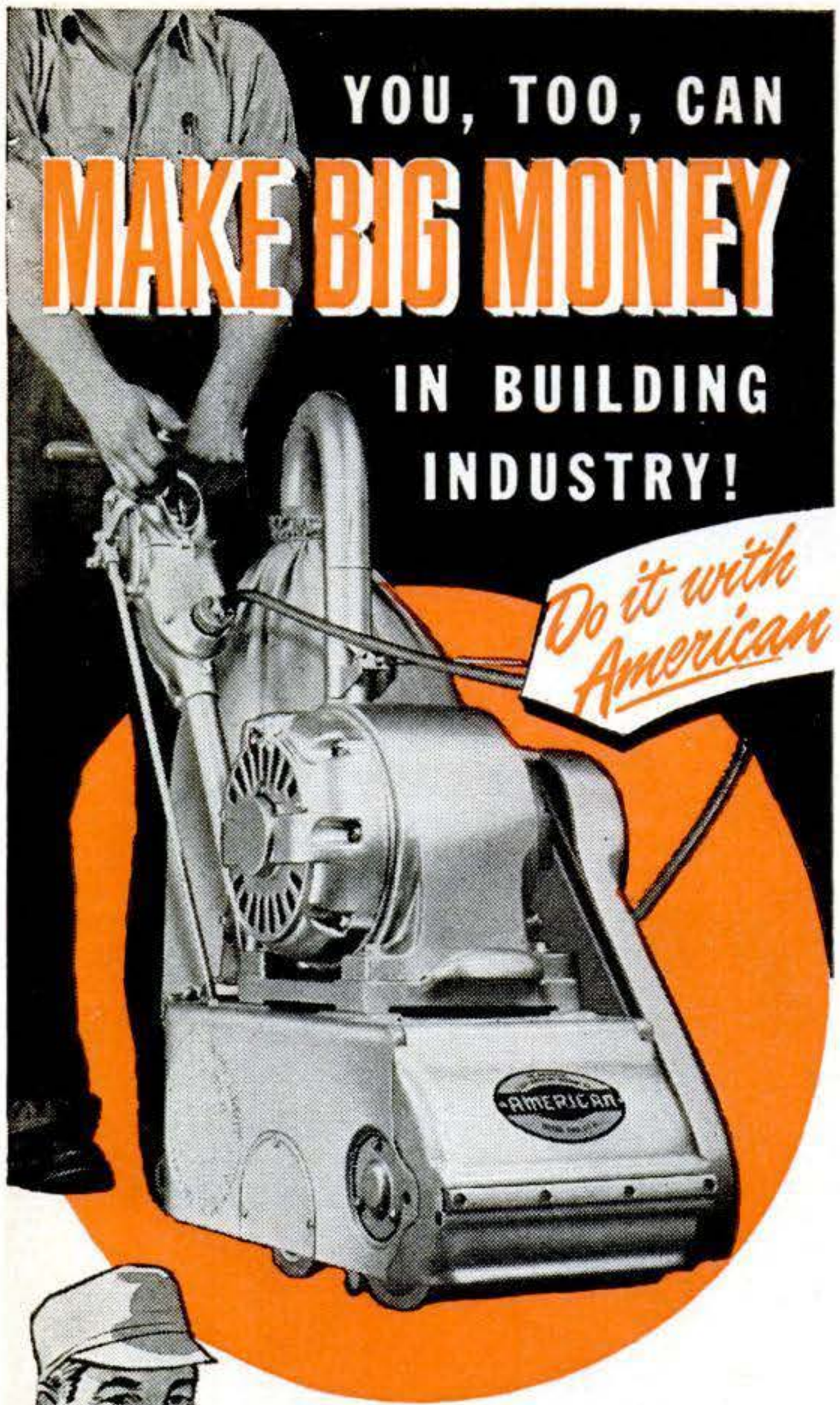
SYNCRO

SAW CORPORATION, Dept. B-28, Rochester, Michigan
Export Address: 120 Wall St., N.Y.C.
WORLD'S LARGEST MAKERS OF ELECTRIC JIG SAWS

How To Order—DO IT NOW!

If no dealer near you, mail coupon with Postal Note, Money Order or check for only $17.50 plus Parcel Post or Express carrying charges . . . or . . . send $17.50 only and we will ship saw collect for Parcel Post or Express carrying charges only. Specify type of delivery on Coupon. Shipping weight, packed, 18 lbs. Hurry! Act promptly—order—we'll ship same day order is received. (No complete COD orders accepted.)

Copyrighted material



BE YOUR OWN BOSS!

Big profits for you — be a floor surfacing contractor and sand both new and old floors! Prospects everywhere —that's why hundreds of men make $35 to $50 a day in floor surfacing work with an American Floor Sander. Easy to operate —no big overhead—no large investment—no special schooling. Just be your own boss and get ahead! Send coupon for money-making booklet.

AMERICAN
FLOOR MACHINES

The American Floor Surfacing Machine Co.
532 So. St. Clair St., Toledo 3, Ohio

Enclosed find 25c in stamps or coin for booklet "Opportunities in Floor Surfacing", telling me how I can start my own floor sanding business.

Name .....

Street .....

City ..... State .....

CHANGE BLADES IN 10 SECONDS
Without opening the case

QUICK-CHANGE BLADES are featured on all Carlson Rules. CHIEF is available in 6-, 8- and 10-foot lengths; WHITE CHIEF and HOBBY in 6- and 8-foot lengths. Keep a "spare" replacement blade on hand.

CHIEF

HOBBY

WHITE CHIEF

SOLD BY LEADING HARDWARE DEALERS

CARLSON STEEL TAPE RULES

JEEP STATION WAGON CAB BODY *FOR ALL WEATHER CONDITIONS!*

Equip your Jeep for all weather comfort with a station wagon cab. Finest waterproof kiln dried hardwoods. Sliding safety auto plateglass windows. Removable rear panel with glass. Lockable doors. Rugged construction. Hardwood body ideal for cold climates because of non-conductivity of cold. We are sole manufacturers of frame cab bodies.

Send 25% deposit with order. Balance C.O.D. F.O.B. Cleveland. $132.50 Plus tax. Complete, ready for assembly.

CLEVELAND WOOD ARTISANS CO.
1760 Lakeview Rd. Cleveland, O.

Also manufacture Complete Hardwood Station Wagon Bodies for Jeeps. Write for details.

Genuine Snap-on Tools

Available Only Through Snap-on's Direct-To-User Tool Service

WRITE FOR INFORMATION
SNAP-ON TOOLS CORP. • Kenosha, Wisconsin

★ ★ ★ "BELT HAND SANDER" ★ ★ ★

High quality—Cut steel gears sealed in grease—Aluminum housing —Bronze bearings. Simply chuck to your 1/4" Electric Drill and you're ready to do a sanding job. Guaranteed. At your dealers' or direct. Sander with 2 belts $19.95. Folder 10c. Catalog 1046 listing our tremendous aluminum stock—Steel—Plastics—Equipment and Supplies 20c. Folder 947M listing Machine Kits for making your own machinery 10c. **Metiplas Supply Co., 1420 South 16th Ave., Maywood, Ill.**

First Choice

Hand and power grinders to fit all needs. Sold at leading hardware stores.

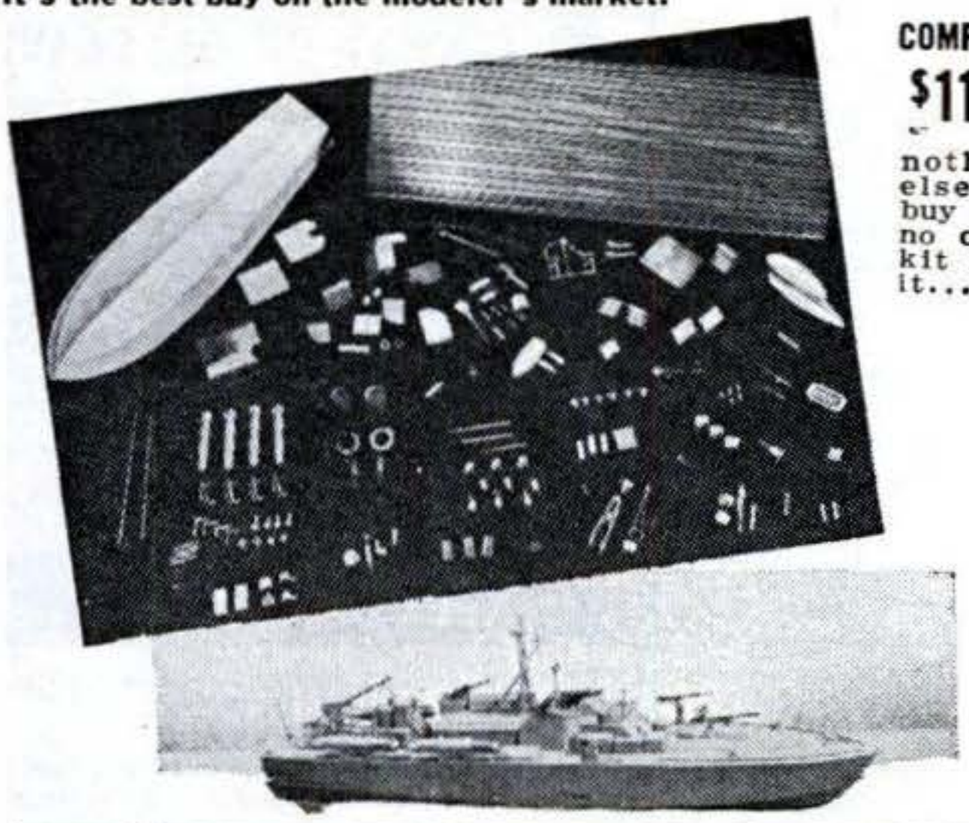
LUTHER GRINDER & TOOL CO.
Sheboygan, Wis.

Luther
HAND AND POWER GRINDERS
Est. 1896

Copyrighted material

THE *New* "AUTHENTICAST" *Elco* P. T. BOAT

The very latest PT boat made—complete with rocket launches, new anti-aircraft guns, newest radio equip., bed and figures. Base fully shaped only needs sanding, scale 3/16" to 1 ft. 95% of all the parts are metal, individually molded, precision-cast... it's the best buy on the modeler's market.



COMPLETE $11.00

nothing else to buy... no other kit like it.....

EVERY "AUTHENTICAST" KIT A COMPLETE BUY

They include all parts, file, brush, paint, steel wool, ducco cement, detailed plans, complete instructions ...EVERY KIT READY-TO-BUILD.

OTHER COMPLETE "AUTHENTICAST" KITS

U.S. AIRCRAFT CARRIER Enterprise (Yorktown Class)	$11.00
U.S. BATTLESHIP MISSOURI (Iowa Class)	11.00
U.S. BATTLESHIP (N. Carolina Class)	11.00
U.S. HEAVY CRUISER (Baltimore Class)	9.00
U.S. LIGHT CRUISER (Cleveland Class)	9.00
U.S. DESTROYER (Sims Class)	6.00
U.S. DESTROYER ESCORT, DE-51 (Buckley Class)	6.00

SEE YOUR DEALER OR WRITE DIRECT

Send 35c for 32 pg., 100 picture "Authenticast" Catalog.

COMET METAL PROD. CO., INC.... RICHMOND HILL 18, N. Y.

V-8 DUALS & SINGLES

DEALERS WANTED

MUFFLERS STEELS and ALUMINUMS with a motorboat tone

SINGLES, Chev., V-8, Plymouth, Steels $5.50, Aluminum $7.00. Chry., Olds., Buicks, etc., Steels $7.50, Aluminum $9.00. V-8 and MERCURY DUALS, Steel $17.50, Aluminum $21.00. Split Manifold Sets, Steels $35.00, Aluminum $45.00. Aluminums are guaranteed for life of your car.

SANDEE MUFFLER CO.

BOX 296 LA TIJ., LOS ANGELES 43, CALIF
2624 W. SLAUSON AVE., LOS ANGELES, CALIF.

THIMBLE DROME RACER

Only **$3.95**

Speed! Action! Can be adapted for miniature engine.

CO2 Power Conversion Kit $2.00. CO2 Engine $4.95.

THE MODEL RACING SENSATION

Completely Finished Race Car—Not A Kit!

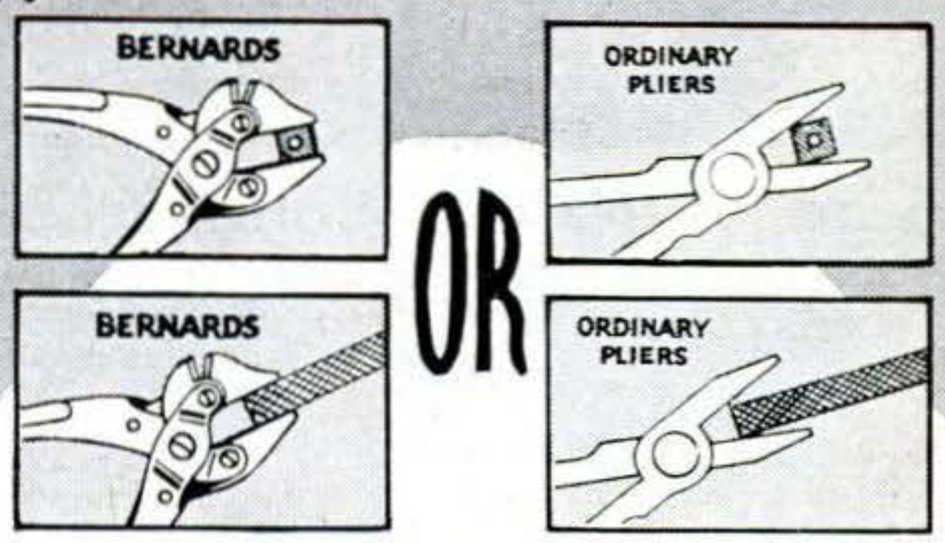
New scale model of midget racer, the classiest thing you ever laid eyes on. Die cast aluminum body, turned aluminum rubber-tired wheels with treads. Chrome exhaust stacks. Wobble pump. Simulated leather seat and back. Instrument panel and numbers. Equipped with bridle lugs for cable track racing.

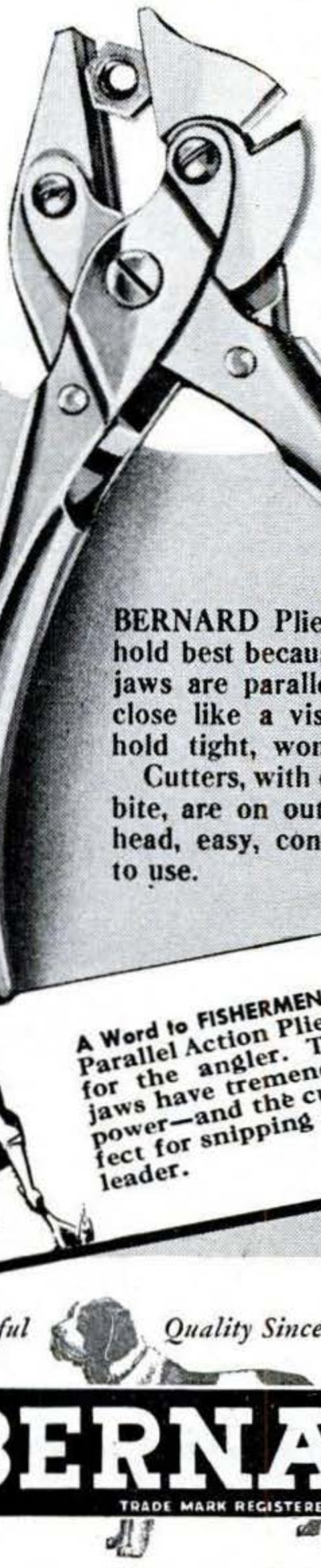
Car is 9⅜" long, 4" high. Weighs 18 oz. Order one today—you can't beat this for fun! Rush order with check, M.O. or cash. $3.95, postage, packing 25c additional. $1.00 deposit for C.O.D.

HOME SHOP PRODUCTS CO., Dept. 22, 4821 Sheridan Road, Chicago

---

WHICH HOLDS BEST?

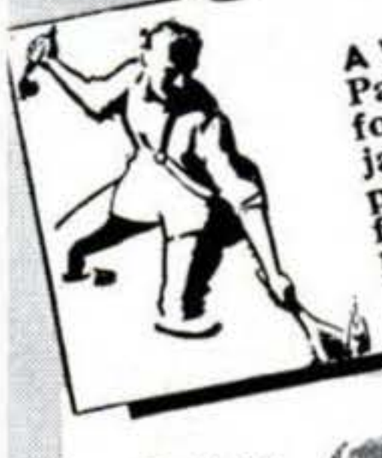




BERNARD Parallel Action Pliers No. 102

BERNARD Pliers hold best because jaws are parallel, close like a vise, hold tight, won't slip.

Cutters, with one-ton bite, are on outside of head, easy, convenient to use.



A Word to FISHERMEN—BERNARD Parallel Action Pliers are perfect for the angler. Those parallel jaws have tremendous gripping power—and the cutters are perfect for snipping a hook or wire leader.

Faithful *Quality Since 1870*

BERNARD

TRADE MARK REGISTERED

For descriptive booklet address

WM. SCHOLLHORN CO.

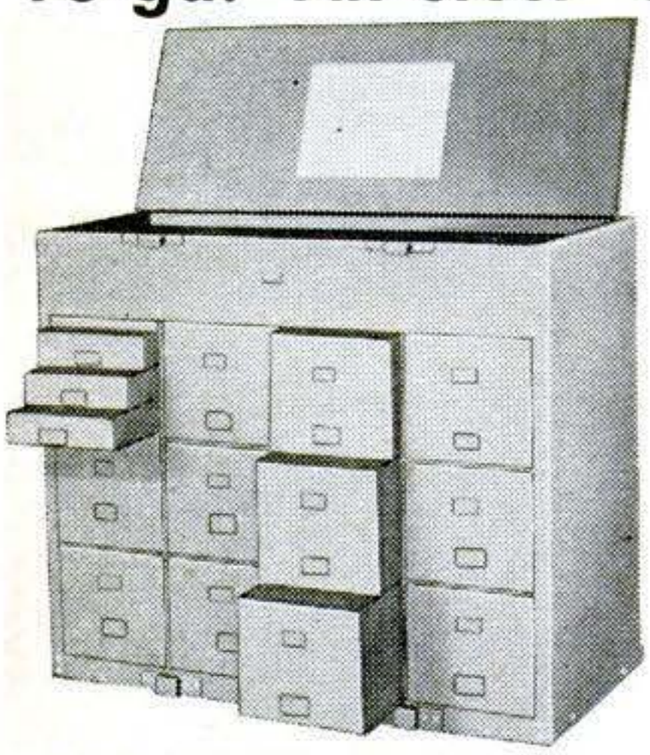
87002 Chapel St., New Haven 9, Conn.

Copyrighted material

FOR HOME WORKSHOPS — FOR GARAGES

STEEL Tool and Spare Parts CABINETS...

16-ga. All-Steel Construction



- 4 ft. wide, 24" deep and 40" high.
- 11 large drawers, —10½" wide, 9½" high, 22½" long.
- 3 small drawers, —10" wide, 2¾" high, 20" long.
- Drawers may be partitioned into 1" compartments.
- Entire cabinet secures with one lock.
- Masonite board riveted on top cover for use as a work bench.
- Shipping weight—400 lbs.

SEND CHECK TODAY!

SUPPLY LIMITED!

Cash with order or ⅓ down—balance C.O.D.

IMMEDIATE SHIPMENT

Only $55.00

FOB Cleveland

WEBER MACHINERY CO.

1801 E. 21st St. **Cleveland, O.**

You can have a good, steady, cash business of your own reconditioning saws with the Foley Automatic Saw Filer, which makes old saws cut like new again. The Foley is the ONLY machine that files all hand saws, also band and circular saws. Easy to operate—no eyestrain.

IMMEDIATE DELIVERY is now available on a Foley Saw Filer. Free Plan shows how to start in spare time. No canvassing. Mail coupon today.

FOLEY Automatic SAW FILER

FOLEY MANUFACTURING CO.
219-8 Foley Bldg., Minneapolis 18, Minnesota
Send Free Plan on Saw Filing business, no obligation

Name _____

Address _____

New STEEL ADJUSTABLE BRACKETS & STANDARDS For HEAVY DUTY SHELVING

LOCKS IN PLACE—EASY TO ADJUST UP OR DOWN

Standards are bolted or screwed into wall vertically. Brackets readily slide into place and are safely locked by patented principles. Can be raised or lowered 1½" variation. Rearrangement of shelving requires very few minutes. You can build mass displays for stores in a Jiffy. Home-owners will find this the neatest, easiest to install shelving available. Ideal for workshop, garages, filling stations, etc. Finest Shelving Equipment available. Inexpensive — will last a lifetime. No special tools required for installation.

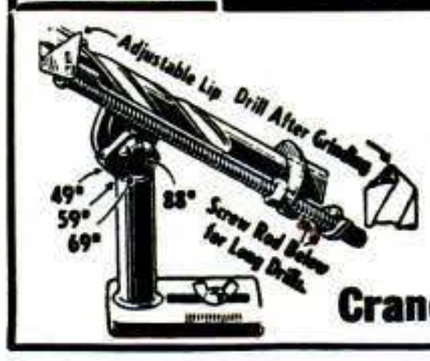
BIG PROFITS FOR SALES AGENTS

Earn big profits installing JIFFY EQUIPMENT in your neighborhood, spare or full time. Write for complete details and prices.

JACKSON MFG. CO. Dept. PS1, 622 East Third St. Kansas City 6, Mo.

NONE BETTER!

SUPER DRILL GRINDER

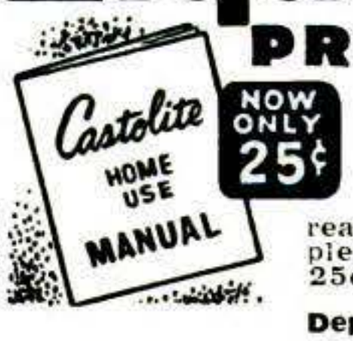


Sharpens round shank drills from 3/32" to 1 1/16" in diameter, up to 11" long. Grinds old drills like new in 4 different point angles, using hand or power grinding wheels. Money-back guarantee.

Price only $2.95
At Dealers or Postpaid

Crandall Mfg. Co. 1512 W. Slauson, Dept. FB-26 Los Angeles 44, Calif.

Liquid Plastic PROJECT MANUAL



Now make many swell articles with CASTOLITE, amazing New Liquid Plastic. Embed flowers, butterflies, medals, photos. Make jewelry, figurines, gears, parts, models, toys. Can be sawed, drilled, carved, turned. Use home tools. New home project manual now ready. Shows how to get into fascinating completely new field. Have fun, earn money. Send 25c today for your copy.

THE CASTOLITE COMPANY
Dept. B-2 Box 211 Kenilworth, Ill.

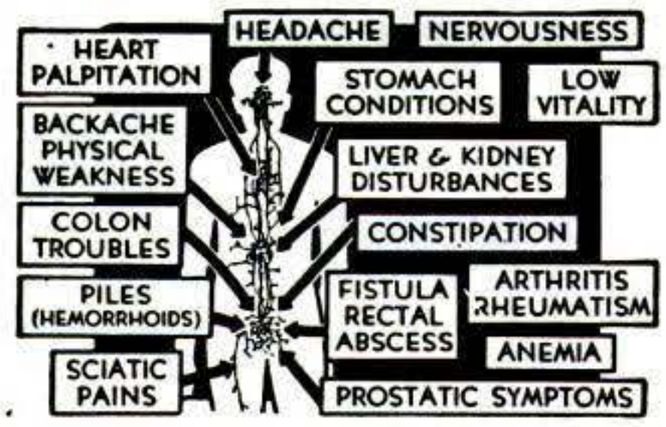
BIG SAVINGS HAND TOOLS

Reg. $1.75 Miller Falls Screw Pitch Gage, 30 leaf, 89c • Wood chisels, higrade steel, ½" or ¼" 69c; 1"-89c • 2" TURNING $1.39 • Depth Gage, adj. angle, Miller Falls, $1.25 • $5.00 COMB. GAGE Feeler, Thickness & Taper, precision tool steel, $2.50. Add 10% postage. No C.O.D.'s please. FREE catalogs.

METAL MATERIALS CO.
3923 VAN BUREN PL. PS-2. CULVER CITY, CALIF.

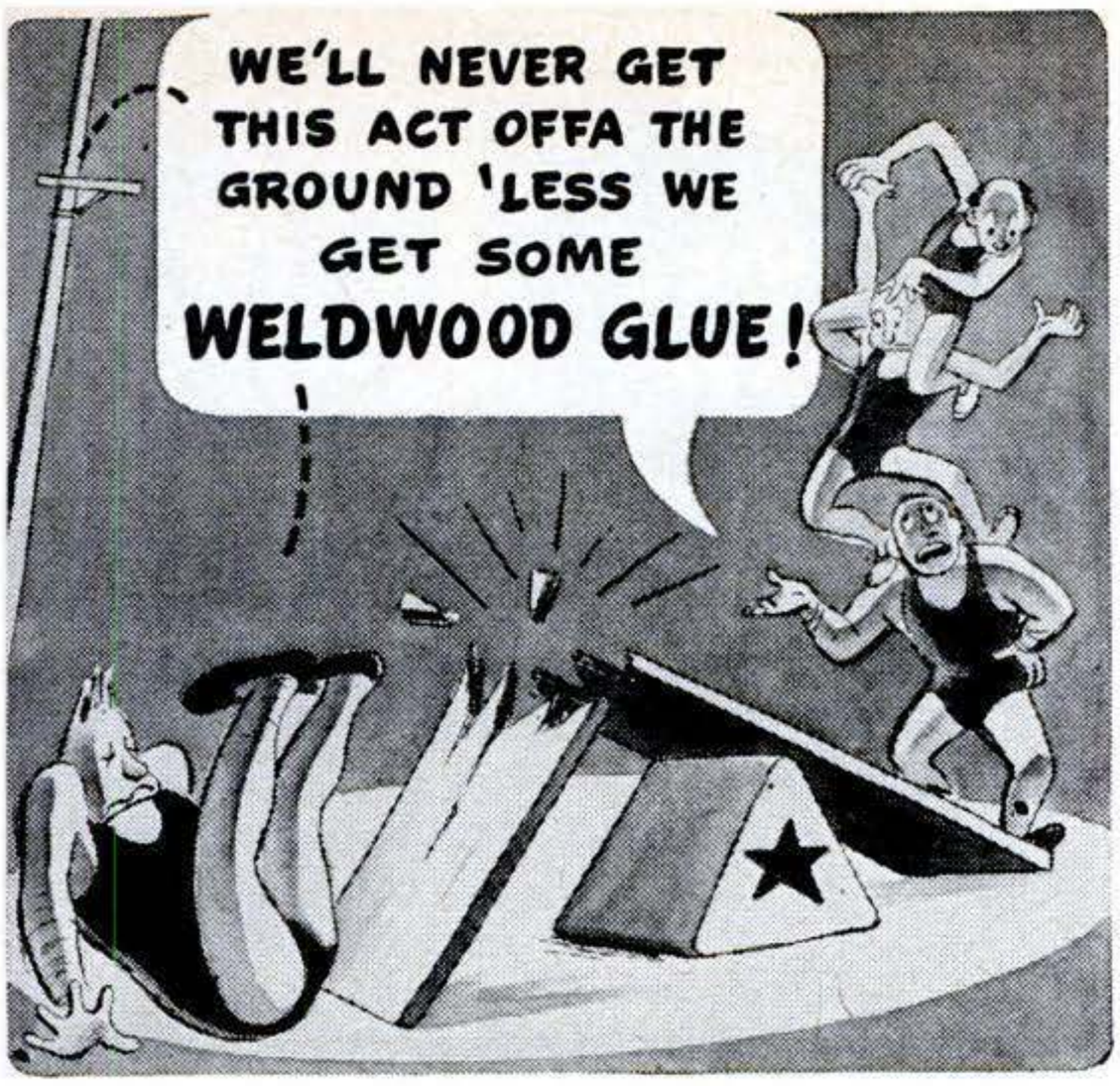
Fistula May Often Result From Piles

FREE BOOK—Gives Facts On Associated Ailments



A new, illustrated 40-page book on Fistula, Rectal Abscess, Piles and other rectal and colon disorders is now FREE to all sufferers. Write today—a card will do. Thornton & Minor Clinic, Suite 249, 926 McGee St., Kansas City, Mo.

Copyrighted material



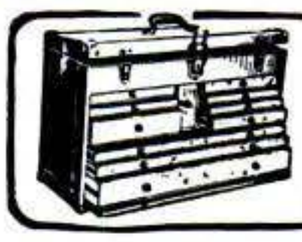
When you want to fix things fast . . . remember Weldwood Glue. It's quick to mix . . . easy to use . . . tremendously strong . . . stain-free . . . rot-proof . . . and permanent. At hardware stores, lumber yards, chain stores.

WELDWOOD
PLASTIC RESIN
WATERPROOF GLUE

United States Plywood Corporation, New York 18, N. Y.

AIR CORPS Type P23 Headphones

AT A FRACTION OF ORIGINAL COST
8000 ohm impedance, bipolar magnets. Extremely comfortable sponge rubber cushions, stainless steel leather covered headbands, concealed terminals. **6 ft. cord with PL55 plug. BRAND NEW.** $15.00 Value.
No. 5A134
Spec. Per Pair..... $2.95 **Plus 25c each for Postage.**
FREE Catalog on Everything in Radio and Electronics.
Burstein-Applebee Co. 1012 McGee, Kansas City 6, Mo.



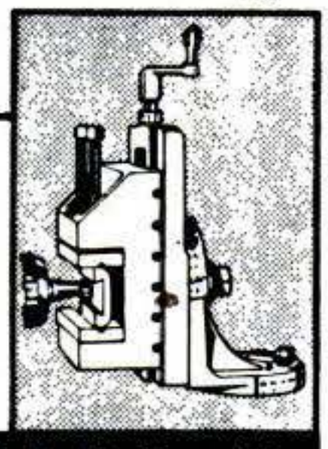
GERSTNER Tool Chests
Better, finer and more desirable for the good tools of Machinists and Toolmakers. Free catalog.
GERSTNER TOOL CHESTS
548 Columbia St. Dayton 7, Ohio

SOUTH BEND ***MILL*** **IT ON YOUR LATHE**

This *Milling and Keyway Cutting Attachment* is ideal for shops not having a milling machine. It can be used for milling, boring, keyway cutting and other operations. Mounts on compound rest base of South Bend Lathes.

Lathe Size	Vise Cap.	Price	Lathe Size	Vise Cap.	Price
9"	1-1/2"	$35	14-1/2"	4"	$65
10"	1-3/4"	$45	16"	4"	$75
13"	2-7/8"	$55	16/24"	4"	$75

Write for dimension sheet



SOUTH BEND LATHE WORKS 456 E. Madison St. South Bend 22, Ind.

THE MODEL OIL!

FIENDOIL

FOR THE MODELS YOU BUILD . . . AND THE TOOLS YOU USE

Fiendoil forms a clinging film that keeps all moisture away from metal . . . and reduces the friction of moving parts in light motors and mechanisms.

40¢
3 OZ.
Spout Can

Cleans
Lubricates
Prevents Rust

For Homecraftsmen

Keep FIENDOIL on your shelf! It's your 3-ounce medicine kit for everything metal . . . a safe, all-around oil for home and workshop needs.

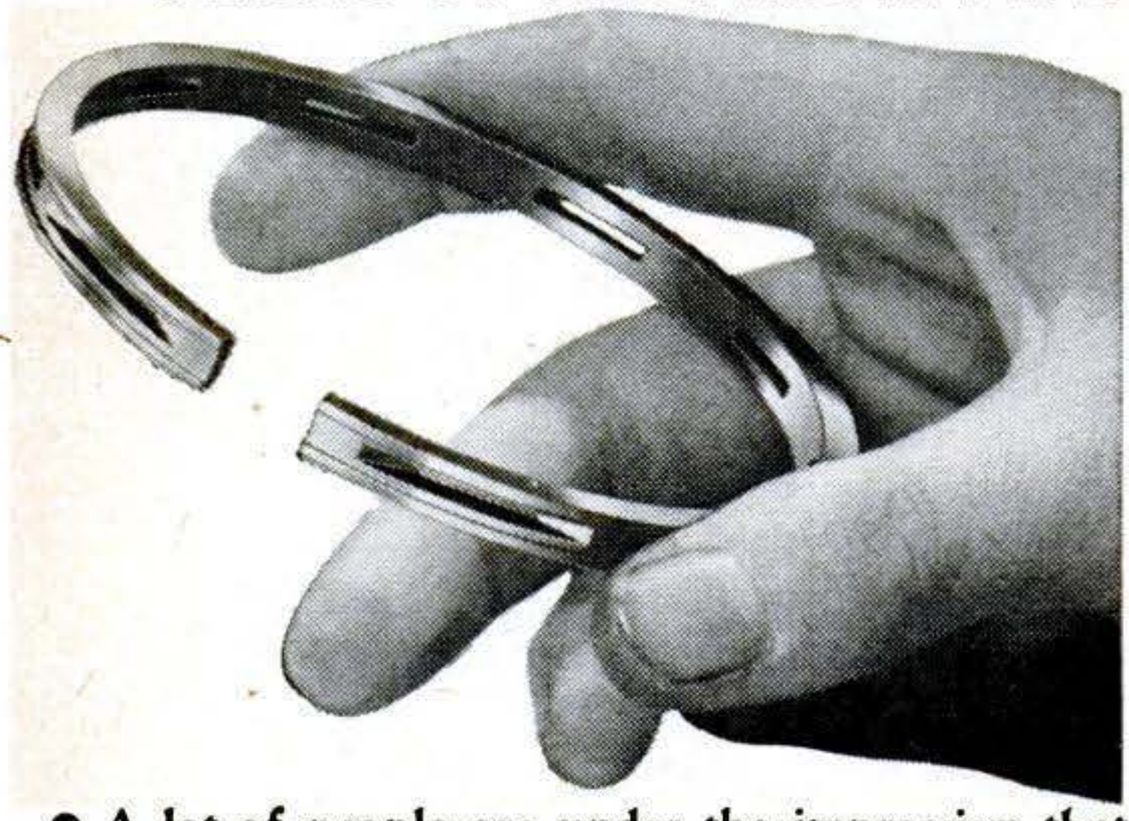
BUY IT AT YOUR HARDWARE OR SPORTING GOODS STORE

McCambridge & McCambridge
Baltimore, Maryland

Copyrighted material

DON'T YOU BELIEVE IT!

... PISTON RINGS ARE NOT SLICES OF CAST IRON PIPE



● A lot of people are under the impression that piston rings are sawed from cast iron pipe. Nothing could be farther from the truth. The modern piston ring is a product of an exacting science. Take Burd "Graf-Flox" Piston Rings for example: (1) They are individually cast of iron prepared in carefully controlled electric furnaces. Each type of ring has its own metal formula that imparts the right degree of hardness, flexibility, tension and long life. (2) Grinding, turning and finishing operations are held to an accuracy measured in ten-thousandths of an inch. (3) By an exclusive Burd process, deeply penetrating colloidal graphite is applied to the finished rings to insure faster seating . . . without danger of scoring, seizing, or sticking in piston grooves. Burd "Graf-Flox" Piston Rings out-perform ordinary rings in rebuilt engines. Fuel and oil losses are *stopped* . . . pep and power are *restored*.

BURD
AUTOMOTIVE
PRODUCTS

MAIL THIS COUPON FOR THESE *FREE* BOOKLETS

BURD PISTON RING CO., DEPT. 128-B
Rockford, Illinois

I'd like copies of your "Servicemen's Handy Handbook" which tells how to keep my car in good working order, and the booklet "No Job For a Dub."

Name. . . . . .

Address. . . . . .

City. . . . . State. . . . . .

---

101 Money-Making Ideas in New Larson Catalog.

EVERYTHING In LEATHER

with **LARSON Leathercraft**

Make Money

On easy-to-assemble belts, gloves, purses, wool-skin toys and mittens, many other useful items. Wide line to choose from. Moderate priced tooling leathers as well as top quality calfskins. All tools and accessories. No experience necessary; instructions come with materials.

Send ten cents at once for catalog.

J. C. LARSON COMPANY
4234 ARTHINGTON ST., CHICAGO 24, ILLINOIS

---

60 POWER TELESCOPE $2.95

VARIABLE EYEPIECE 20X-40X-60X

NEW! **Three telescopes in one, 3 different magnifications.** 20 power for ultra-bright images with 40 and 60 power for extra long range. Guaranteed to bring distant objects, people, sports events, ships, moon, stars, etc., 60 times as close.

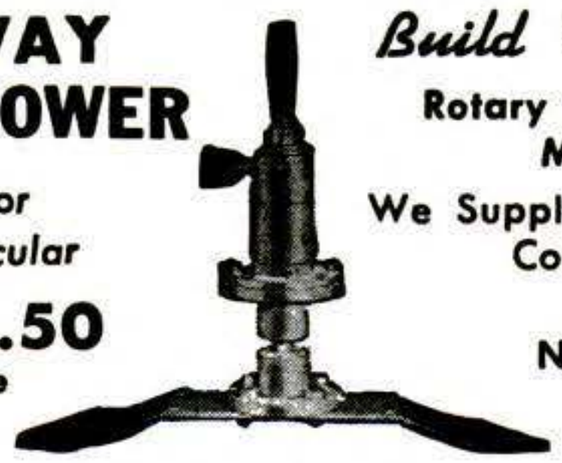
Most powerful for anywhere near the money. 5 sections. Closes to 1 ft. long. Contains 4 ground and polished lenses. Also used as a powerful compound microscope. Directions included. Mass production enables us to offer this high-powered instrument at the amazing price of only $2.95. We pay the postage. Get yours immediately.

BROWNSCOPE CO. Dept. 2P 24 West 45 St. New York 19, N. Y.

NU-WAY LAWN MOWER

Write for FREE Circular

Price **$12.50**
Why Pay More



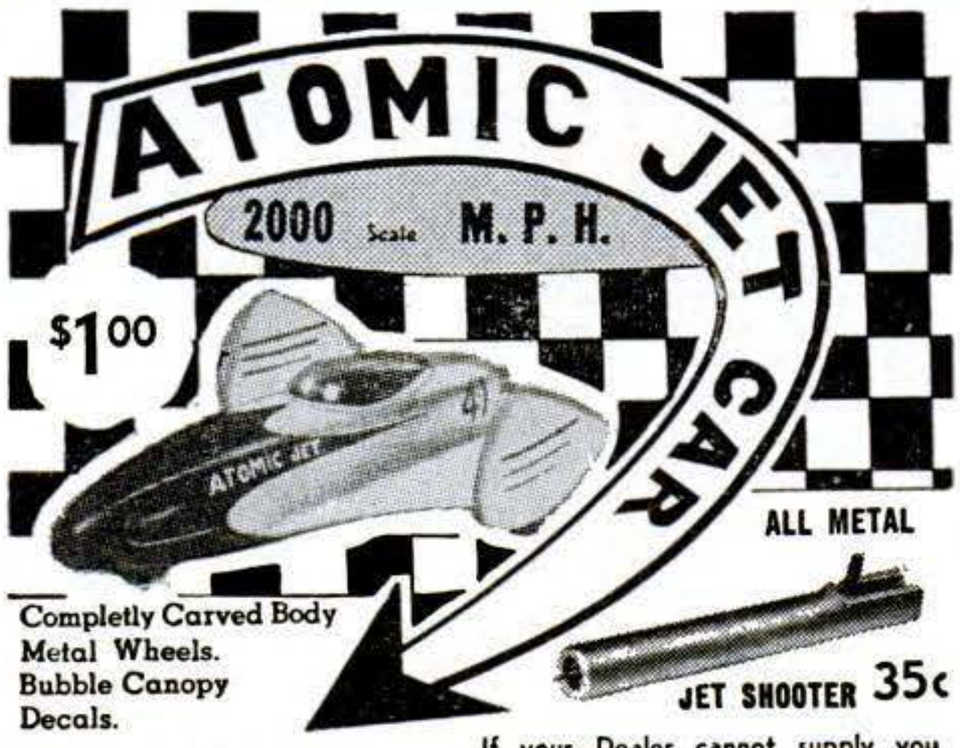
Build Your Own

Rotary Type Lawn Mower

We Supply Cutting Unit Complete.

NO INCREASE IN PRICE

TRACTOR-LITE MFG. CO., SPIRIT LAKE, IOWA



Send 15¢ for Catalog

If your Dealer cannot supply you send 10% postage and order direct.

The Megow Corporation Philadelphia 22, Pa.

Copyrighted material

SAVE UP TO 85% in WAR SURPLUS...SENSATIONAL VALUES at "GADGETEER'S HEAVEN"

IN MANY ITEMS WE HAVE THE WORLD'S LARGEST SUPPLY

New B-15 STYLE JACKET

A garment you'll be PROUD to wear! Water repellant, wind resistant, nile green, sateen, genuine Zeeland Sanforized Poplin, full zipper Front with slash pockets and large genuine Mouton Fur Collar. Heavy Alpaca lined for Warmth. Sleeves also lined with Heavy Rayon. Rib-knit cuffs & bottom sizes 34 thru 46 AND LOOK AT THE PRICE ..... $13.95 ea.

NAVY N-4 TYPE JACKET

New, Water repellant, wind resistant, Poplin Body and sleeves all wool lined zipper closure with button flap collar for extra protection, 2 slash pockets. $8.95

ANOTHER "SCOOP"

NEW, K-21 AIRCRAFT CAMERA (5" by 7") Eastman Kodak Lens, F 2:5, 7 in., 178 mm., 5x5, E. M. 1215.

With filters for haze, and night operation. 24V motor and all drives for operating this amazing camera. Graflex Mfg.

A $500 Value for $75.00 Ea.

PLEXIGLASS DOMES

15"x19½"x6" deep. ¼" thick. Can be used for home hothouse, fish bowl, washbowl, ornamental light. Can be flattened in oven and will make flat sheets, 15" x 19½" x ¼". Weight 3¼ lbs. Also 200.000 lbs. of other plexiglass sizes and shapes. #700 $1.69

TEAR SHAPED PLEXI DOME

Overall length 21," width at widest point 11," at base 4." 6" deep. $1.39 ea. #70-1-A

BC 306-A NEW SIGNAL CORPS TUNING UNIT

In heavy alum. case with black crackle finish-16"x10"x8". Velvet vernier dial knob, calibration 0-100, with locking assembly. Switch - 5 position with knob. 4½" diam. coil with three others inside, and movable induction tuning coil. WORTH MANY TIMES MORE $1.89 ea.

RADIO HEAD SETS

EXCELLENT CONDITION. LOW IMPEDENCE. AN-BH-1. WITH LEATHER SPONGE RUBBER PADS ..... $1.00 ea.

ARMY AIRFORCE TYPE A-2 OFFICER'S JACKET

The 1947 Leather Jacket Sensation. Made of selected Cordovan Leather with concealed full zipper. Fly Front. Large patch pockets with snap flaps and stitched epaulets on shoulders. Blouse back and finest quality Gaberdine lining. Sizes 34 thru 46 A STEAL AT THIS PRICE ..... $18.49 ea.

NAVY MELTON COSSACK STYLE JACKET New

All Wool, Sturdy, Warm. Zipper front 2 slash pockets, taped collar. A Wonderful Buy for utility & long lasting qualities. $6.75

VICTOR CUTTING TORCH $15.75
Type #400SS. Used, but in good Condition

#155 16 MM MOVIE CAMERA

Magazine Loaded Battery Driven. Completely converted to Civilian use. Handy No Winding - Includes 24 volt Battery, View Finder, Switch and Cord.

Standard size film always available. Easy daylight loading magazine, easily carried.

A $200.00 BUY FOR ONLY $53.95

MICARTA TUBE

M-1

Ideal for Insulation or Bushing Stock. 36" x ¼" wall x 1" O. D. Original use was for trailing antenna - F 10. Use for towel rack, souvenir displays, shafting spacers, bearings etc. In original carton. 59c ea.

PILLOWS

CURLED CHICKEN FEATHERS 26" x 17" 99c ea.

#424

Blue & white ticking. New, but still Renovated and Sterilized, in accordance with Laws of Califorina.

New Skiing Goggles Poloraid

Colored lens. Your protection against wind & glare of dazzling snow. Motorcycling, etc. A Terrific Value at ..... 33c ea.

NEW HUNTING KNIFE #307

6" chrome vanadium blade 4" handle, leather grip. In leather sheath. $5.98 Value For Only $1.69

NAVY AIRFORCE TYPE A-2

NEW NOTHING'S TOO GOOD FOR THE U. S. NAVY" SAME AS ARMY TYPE A-2 BUT WITH LARGE GENUINE MOUTON COLLAR AND MADE OF AERO TAN LEATHER Sizes 34 thru 46 A TREMENDOUS VALUE $19.95

New Cossack Aviation Style Jacket

CORDOVA LEATHER WITH DIAGONAL ZIPPER FRONT HIP LENGTH. EASY MOVEMENT. 2 Slash Pockets, also upper Cigarette Zipper Pocket. Leather Lapels, Yoke Back with Half Belt. Sizes 34 thru 46 Ideal for Motorists, Cyclists, Equestrians, Sportsmen, etc. You'll Like 'em $16.95

FLYING HELMET

#407 - Fleece-lined winter — .....

#407 A —Summer weight 69c

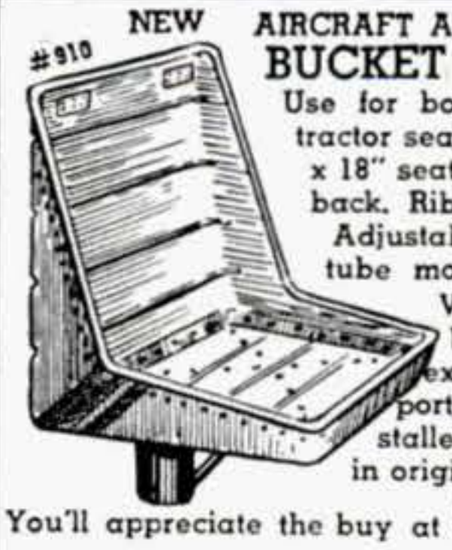
Ideal for cycle drivers, racers, sportsmen. Used, but in excellent condition.

OXYGEN MASK

A-14 Demand type. Slightly used, but perfect. $1.95 ea. A terrific deal with "mike." ..... $2.50 ea.

#908

NEW AIRCRAFT ALUMINUM BUCKET SEAT



#910

Use for boats, jeeps, tractor seats, etc. 17" x 18" seat, 18" x 24" back. Rib enforced. Adjustable height tube mounting. Wide, high back gives excellent support. Easily installed. Shipped in original carton. You'll appreciate the buy at $4.95 ea.

CUSHIONS

New leather cushions of finest pigskin, color, yellow. Filled with kapok. Will float. Size - 22½"x17"x1½" thick. At fraction of Gov't. cost $2.95

New Navigators Magnetic Compass

D-12

type D-12 size 7" dia x 4½ deep Rubber lined - rotating verge range ringe calibrated in 1 degree from 0-360° with 2 parallel grid wires for alignment with N.S. line. Boats, airplanes, etc. No kidding, a steal at $17.95 ea.

NEW SHERRILLS VEHICLE MAGNET COMPASS M-6 com. with mounting bracket, deviation calculators and instruction manual size 3¼"x5½". Ideal for Plane, Boat, Truck, Auto, etc. ..... $5.95 ea.

M-6

ORDER DIRECT FROM THIS AD

All sales final. Make remittances by money-order, bank draft or personal check. Purchase orders acceptable from D & B firms. All quotations F. O. B. Los Angeles.
FREE BIG ILLUSTRATED CATALOGUE AVAILABLE
Send ⅓ deposit with C. O. D. orders. Also Complete Aircraft Supplies

FOR THE FREEZE THAT'S COMING!

AIR CORPS FLEECE LINED LEATHER JACKET

1/3 to 1/5 Gov't Cost! (approx.)

- Made to last.
- Full sheepskin pelt.
- Fleece-lined collar.
- Leather taped seams.
- Full length zipper.
- 2 zippered, deep, slash pockets.
- Adjustable strap & buckle at throat.
- Type D-1, styled for easy, bind-free action.
- Soft, pliant, "aviation tan" leather.

Thousands of Satisfied Customers

Made to U. S. Gov't. specifications — "nuf sed!"
Sizes: #401, small; #402, medium; #403 large.
You've never seen them at these prices. Reconditioned, cleaned and brushed.

$8.95 While They Last!

SLEEPING BAG

NEW! 100% wool. Mummy type. Heavy duty 30" zipper. Gov't. cost $22.00 #303 $4.95 $1 extra for used water repellant cover.

NEW TARPS - HEAVY CANVAS

Mildew & Flame Resistant. Cheap Outside Storage. They are Really Moving at These Prices.

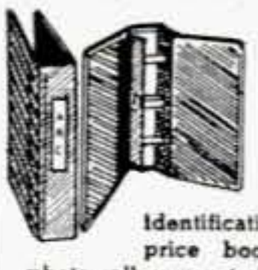
5' x 7' ..... $3.95 9"x16" $11.95
8½' x 10' .... $8.50 14' x 21' .. $27.50

NEW 100% ALL WOOL BLANKET

7 x 7 ft. Extra heavy. Also Double warmth. Fits Wood's Robe sleeping bag. $4.65 #414

Twas Made for the Air Forces!

THE BEST Loose Leaf BINDER



You ever saw - 3 metal post. Cylindrical locking heavy duty 3/16" fabricated hinged cover. End identification window. Ideal for price books, salesman catalogues, photo albums, students, publications, Reference books, artist sketch books, etc. Will hold 500 sheets, 8½" x 11". A $5.00 Value for Only ..... 59c ea.
100 Page Binder Bond Fillers for 25c Extra.

HORSEHIDE WORK GLOVES

ALL LEATHER GAUNTLET TYPE REINFORCED PALMS & FINGER STITCHING. LENGTH 13¾". #381 $1.95 pr.
ALL LEATHER WRIST Length 10¼" ..... $1.55 pr.
Barbed wire, welding, all purpose work gloves.
A Steal . . . Gov't. cost many, many times more.

COMPASSES

#151 Marching, lensite, with luminous dial $1.69
#152 Matchbox, both jewel & liquid floating dial 39c
#154 Wrist strap Compass 69c

PALLEY SUPPLY CO. THE LARGEST FIRM OF ITS TYPE IN THE WORLD

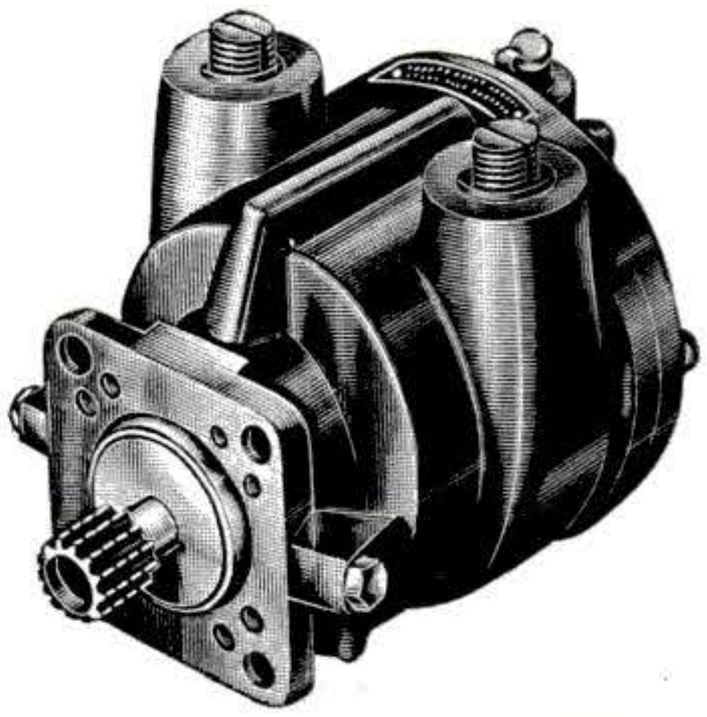
DEPT. P. S. 28 — 6321 SAN FERNANDO RD. GLENDALE 1, CALIFORNIA

WAR SURPLUS BARGAIN SPECIAL

BRAND NEW!
VACUUM-AIR HYDRAULIC

GENERAL PURPOSE PUMP

Original Cost $45.00
Now Only
$9.95
Postpaid in U.S.A.



WORTH MANY TIMES THIS LOW SALE PRICE

USE THEM FOR
OIL BURNERS
SPRAYING MACHINES
MILKING MACHINES
COMPRESSORS
VACUUM PUMPS
HYDRAULIC SYSTEMS
MANURE LOADERS
PRESSES, etc.

● Originally cost $45.00. Used by the Air Corps to drive bomber de-icer boots, gyroscopes, automatic pilots, etc. May be used as air or fluid pump—for pressure or vacuum. Standard 3/8 inch pipe thread with interchangeable ports. Will pump 7½ gal. SAE 30 oil per minute at 300 RPM. Builds air pressure of 30 lbs. per sq. in. at 1000 RPM. Vacuum will draw 26 inches of mercury at 1750 RPM. Develops up to 120 lbs. per sq. inch of hydraulic pressure, which in conjunction with a 3 inch hydraulic cylinder, will lift 840 lbs. minimum. Runs forward or reverse. Self aligning shaft. Die cast aluminum housing 6x4x4 inches. Has stainless alloy steel vanes and impeller. Made by Bendix Avia. Corp. Spline terminal for direct drive—readily replaced with a pulley. Recommend a ¼ H.P. or stronger electric motor as source of power. Rated capacity 1500 RPM with high overload factor. Special price for quantity users. Complete illustrated report and instruction booklet FREE with every pump. Send check or money order today. Postpaid in U.S.A.

$9.95

GROBAN SUPPLY CO. **1507 So. Michigan Avenue Dept. PS-2 Chicago 5, Ill.**

QUICK PROFITS!

$84.00 A WEEK FROM 2 SALES A DAY

SELL RANDOLPH *Fire Extinguishers*

Every building holds a prospect. Homes, Boats, Cars, Garages, Gas Stations, Shops, Laundries, Farms, Hotels, Stores, Factories.

THEY WANT A RANDOLPH with its panic-proof trigger action that smothers the fire instantly in a snowy blanket of carbon dioxide. No mess, no water, no damage, even to food. It evaporates without a trace.

YOU CAN QUALIFY for exclusive territory to sell the famous, nationally advertised Randolph used by leading industrial concerns everywhere. Approved by Underwriters' Laboratories.

Quick profits await those who act at once. Four sales a day net $168.00 a week. Write today for full or part-time plan, territories, demonstration kit, etc. Don't delay.

Randolph Laboratories, Inc.
4 EAST KINZIE ST. CHICAGO 11, ILLINOIS, U. S. A.

For Higher Yields at Lower Cost...
CROP CONDITION YOUR LAND with a SEAMAN ROTARY TILLER

USED FOR MANY YEARS BY U. S. DEPARTMENT OF AGRICULTURE

Many farmers report increased yields of 10% to 30% on Seaman-tilled land. Here are some of the reasons why this is possible:

. . . The SEAMAN TILLER increases soil fertility by milling cover crops, manure and commercial fertilizer into the GROWING AREA of the seedbed . . . Holds more moisture in the seedbed, longer . . . Encourages the development of nitrogen-producing bacteria through soil aeration . . . Promotes early germination of seed by helping to maintain higher seedbed temperatures . . . Eliminates plant-starving air pockets in the seedbed . . . Helps to control weeds, grubs and many other crop pests . . . Makes crops more drought-resistant by promoting sturdier, healthier growth.

Write for "Questions and Answers" pamphlet. It tells you what you want to know about SEAMAN TILLERS. Full range of sizes, from 3 ft. to 7 ft. tillage widths, power take-off or motorized (gas or diesel-powered) models.

SEAMAN MOTORS, Inc., 365 N. 25th St., Milwaukee 3, Wis.

$ $ $ profits with FURNACES

REALE HEAT furnaces. FULL Line. Gas & Oil Circulating heaters & floor furnaces. Burners & Blowers. Of interest to Contractors & Builders. Dealers Franchises. Write for free details.
PEERLESS SALES, 4318 Sheridan Blvd., Lincoln 6, Nebr.

ARC WELDER

BUILD YOUR OWN!

For light or heavy work. No rewinding necessary. 16 Heats. Use old auto generator coils. Complete plans and catalog. 35c. **LEJAY MFG. CO., 3323 LeJay Bldg., Minneapolis 8, Minn.**

***Write For* FREE Literature**

Ball Bearing Attachment

Converts to a POWER MOWER
Interchangeable saw and mower blades—Use as a saw or lawn mower.

BUILD YOUR OWN
POWER SAW

Clear Brush and Scrubs From Land Quickly and Easily

SAVE MONEY
Now anyone can save time and work clearing brush and small trees from land by building their own power saw. Save hours of back breaking work—Save the cost of buying a power saw—Build your own quickly with parts and instructions we furnish. Write today for complete FREE information.
T & H Mfg. Co., 811 E. 31, Dept. M112, Kans. City, Mo.

Get Into PLASTICS

Make Big Money As Novelty Manufacturer!

Free Book on Plastics tells you how to start your own business. Answers your "Plastic" questions. Read about Flexible Molds, Artificial Liquid Marble and other profitable products.

Act Now! Get started while the field is not crowded. Write Today!

FREE BOOKLET

BING PRODUCTS **Dept. B28, 88 Broad Street Boston 10, Mass.**

Copyrighted material

FOR SALE 1 ACRE OF PLOWED GROUND ONLY 35¢*

Yes sir! A BREADY GARDEN TRACTOR will plow an acre on just two gallons of gas. BREADY, with complete line of all-purpose, year 'round implements, does *all* the work on small acreage, is a *profitable* auxiliary for larger farms. Easy-handling, powerful, low in cost. WRITE TODAY for free folder!

* *Depending on price of gas.*

Bready GARDEN TRACTOR

THE BREADY TRACTOR & IMPLEMENT CO.
BOX NO. 213 **SOLON, OHIO**

PLYWOOD BOAT KITS

$49.00
(Including Freight)

This READY-CUT 12 ft. fishing boat can be assembled in 8 hrs. without forms or special tools. Kits are complete including all hardware, paint, and etc. Send for free folder.

TAFT MARINE WOODCRAFT
Dept. K 636 39th Ave. N.E. **Minneapolis 18-R, Minn.**

IT'S EASY TO *"Trim-it-Yourself"* with **CHROMTRIM METAL MOULDINGS**

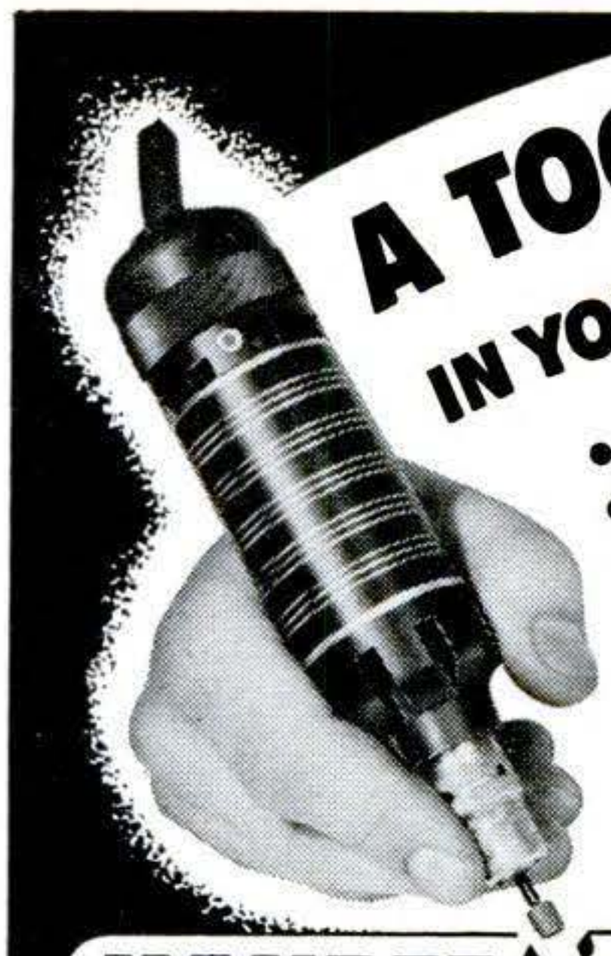
The perfected metal trim for wall or floor linoleum and building materials. 6' lengths, 8 shapes, easy to cut and apply.

Send 10c for "Trim Ideas" 16 page booklet. Over 30 projects and remodelling suggestions on where and how to use CHROMTRIM. Hints on lino-laying.

R. D. Werner Co., 291 Fifth Ave., N.Y. 16
Enclosed is 10c for CHROMTRIM "Trim Ideas" booklet P
Name_____
Address_____
City_____ Zone____ State____

REMODEL KITCHEN BATH • ATTIC

MAKE METAL PROJECTS with CHROMTRIM



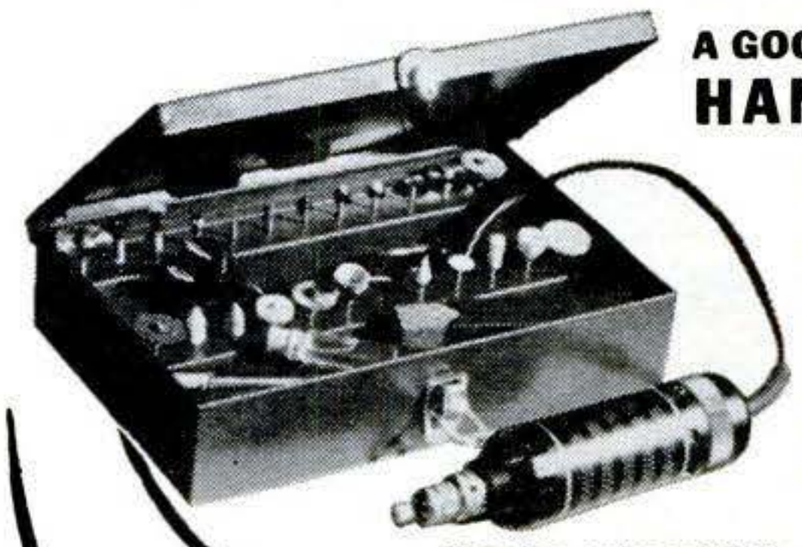
A TOOLSHOP IN YOUR HAND!

• GRIND • DRILL • ROUT
• POLISH • ENGRAVE
• CUT • SAND • SAW • etc.

MAKE THINGS FROM WOOD PLASTICS—METALS—GLASS LINOLEUM—LEATHER ALLOYS—HORN—STONE BONE, etc.

HANDEE TOOL OF 1001 USES

THE FIRST TOOL OF THIS KIND—TODAY'S FINEST!
Smooth, steady power at your fingertips! Perform precision operations not possible with any other portable tool! With a Handee you can turn out professional looking projects for pleasure or profit—ship, plane and train models, delicate, internally carved costume jewelry, wood carvings, puppets, initialed tumblers, etc. AC or DC. 25,000 r.p.m. Wt. 12 oz. Over 500 accessories made especially for the Handee!



A GOOD START—THE HANDEE KIT

HANDEE Tool and 40 most popular accessories packed in compact steel carrying case. You'll be amazed at what you can accomplish! At stores or postpaid **$27.50**

Handee only, with 7 accessories, $20.50

FOR YOURSELF OR A FRIEND... THE GIFT OF A LIFETIME!

NEW PLASTIC-CRAFT KIT

For internal carving. Contains special plastic cutters, buffers, sanding discs, buffing compounds, a liberal supply of clear plastic, dyes, cement and instructions. At stores or postpaid **$6.95**

GET A HANDEE at stores everywhere. If they can't supply you we'll send it postpaid. Satisfaction guaranteed. Free 52-page Manual on request.

CHICAGO WHEEL & MFG. CO.
1101 W. Monroe St. Dept. PO. Chicago 7, Ill.

Send ☐ Handee Kit ☐ Handee Tool ☐ Plastic-Craft Kit
☐ C.O.D. ☐ Remittance enclosed ☐ Send Manual

Name.....

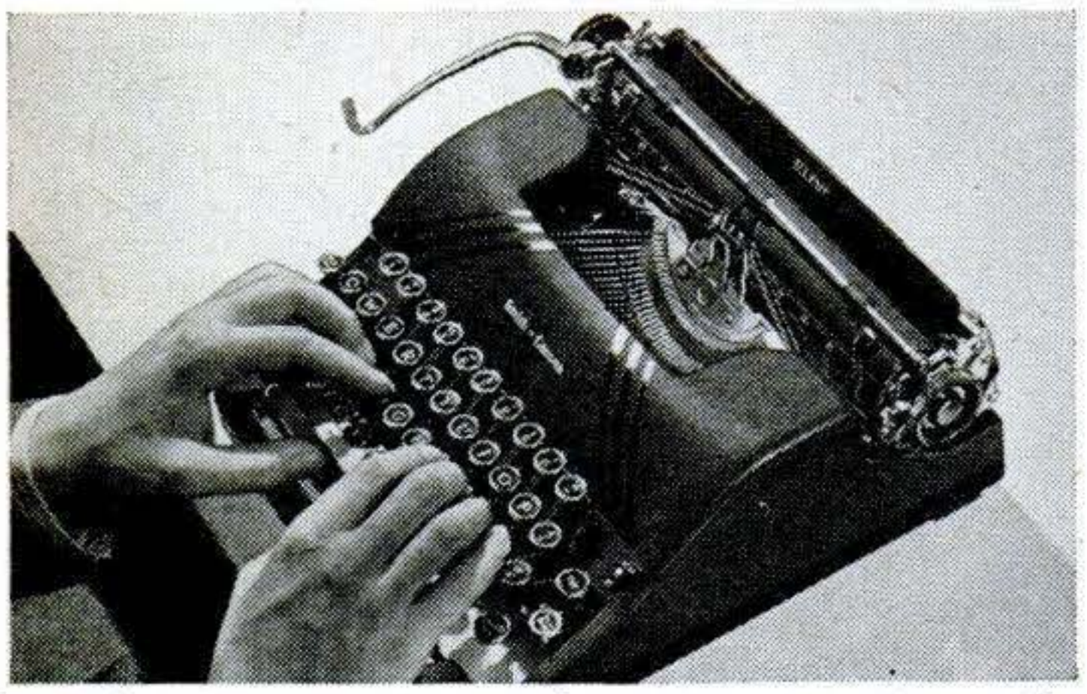
Address.....

.....

Copyrighted material

BIG MACHINE FEATURES!

You get them in a SMITH-CORONA
PORTABLE TYPEWRITER



Regulation 84 character keyboard same as on big office machine

5 Big Machine Aids

1. TOUCH SELECTOR
2. VARIABLE LINE SPACER
3. FLOATING SHIFT
4. ONE STROKE RIBBON REVERSE
5. TYPEBAR SPEED BOOSTER

ASK DEALER FOR DEMONSTRATION

Smith-Corona
PORTABLE TYPEWRITER

MAKES NIGHT DRIVING *Safer*

NOW!

NEW CASCO POP-OUT

Illuminated Cigarette Lighter

No need to take your eyes from the road while "lighting up" your cigarette. Casco's automatic pop-out lighter—in 9 out of 10 cars—now comes with an "illuminated well" to guide your hand in the dark in replacing your lighter unerringly . . . instantly.

Bring your present Casco-made lighter up-to-date with the illuminated well alone for $1.50.

Or—install a complete new Casco Vis-O-Lite Automatic pop-out lighter for only $2.75.

At auto supply stores, service stations and garages wherever you go.

CASCO PRODUCTS CORPORATION, BRIDGEPORT 2, CONN

HARGRAVE

No. 530 CARRIAGE CLAMP

INDIVIDUALLY TESTED

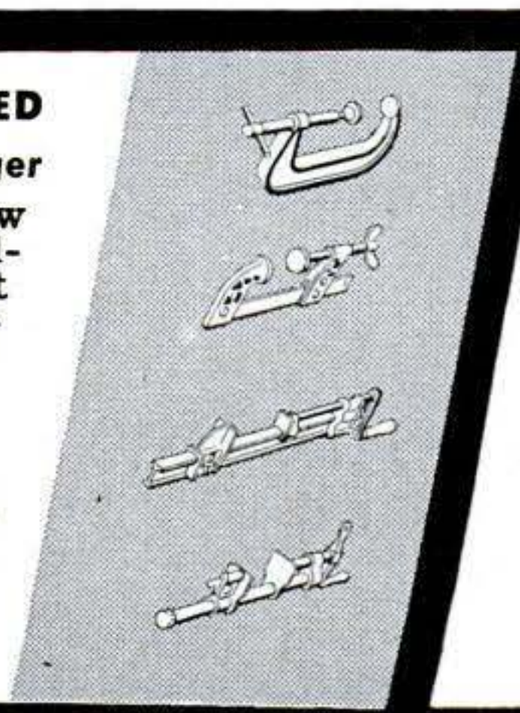
Made right to last longer

Made of a powerful new metal stronger than malleable. Steel screw is heat treated to prevent battering of threads. Individually tested. Openings from 3" to 8".

At Hardware and Mill Supply Dealers Everywhere.

Write for Catalog of Complete Line.

1955 Waverly Ave.
Cincinnati 12, Ohio



The **CINCINNATI TOOL** *Co.*

DEEP TONE
Dual Mufflers
for Ford, Mercury

Scientifically designed straight-thru muffler reduces back pressure. Greater power, speed, and economy. NEW brilliant Deep Tone makes your car standout. Heavy blowout-proof construction. Rugged steel tube throughout (No aluminum).

Simplified Installation. No cutting, no holes to drill. Rubber mounted clamps eliminate usual rattle. Complete with all necessary fittings, etc. Order direct and save. State year and model. Sent C.O.D. from Los Angeles. Price $20.

"Deep Tone" single muffler for Chevrolet, Ford, Plymouth—$4.86.
All other makes—$5.50. Chrome tail pipes, 2½" dia. $1.75

ADVANCE MUFFLER CO.
6800 S. Vermont, Dept. PS-28, Los Angeles 44, Calif.

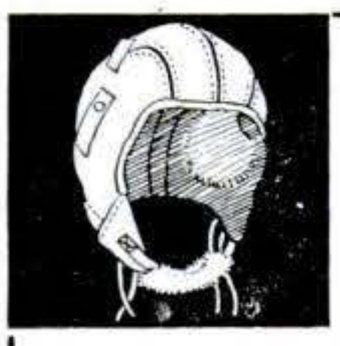
ONE-MAN SAWMILL LESS THAN $200.00

Easy To Turn Trees Into Money

Makes Lumber ties, shingles, crates, lath, studding.

BELSAW MODELS in 10 to 24 foot sawing lengths. **MECHANICAL FEED,** accurate set works and positive dogs. Use tractor or old auto engine for low cost power. Thousands used for commercial sawing. Pays for itself quickly. Send post card today for FREE booklet, "How To Make Lumber" and Catalog of Woodworking Equipment.

BELSAW MACHINERY COMPANY
284F-: Field Bldg., 315 Westport Rd., Kansas City 2, Mo.



2 FOR ONLY $1.00

AAF FLYING HELMETS

New—Fleece Lined Muffs and Chin Straps

FREE—AAF OXYGEN MASK—NEW

Mail your name and address, and the items will be shipped C.O.D.

FORTUNE & SHAW
2250 McKinley **Fresno, Calif.**

OLD GOLD JEWELRY WANTED

Dental gold teeth, plates and bridges with metal attached. Any broken pieces of gold jewelry. Immediate payment and free mailing container to you or your friends upon request.

LOWES, DEPT. PS **Holland Bldg., St. Louis 1, Mo.**

SIGNS AND **SHOWCARDS** EASILY AND EXPERTLY PAINTED WITH LETTER PATTERNS

MANY SIZES & STYLES WRITE FOR FOLDER!

JOHN F. RAHN
1330-33 N. CENTRAL AVE.
CHICAGO 51, ILL.

Copyrighted material

NEWEST WAR SURPLUS RELEASE!

ALL SIZES

$1.98 PAIR

4 BUCKLE—HEAVY DUTY

ALL RUBBER

OVERSHOES

Genuine rubber that's tough and resilient! So heavy and durable, they'll wear for years, just like automobile tires do. They're war surplus, in perfect condition, just like new, and easily worth $5.00 a pair. All sizes. Protect your feet, your shoes, your health!

Send No Money. Pay Postman $1.98 Plus Postage.

WORLD WAR SURPLUS STORES, Dept. P.S.
841 S. Blue Island Ave. Chicago 7, Illinois

Allow 10 Days Delivery

EXCITING

Art Lamp

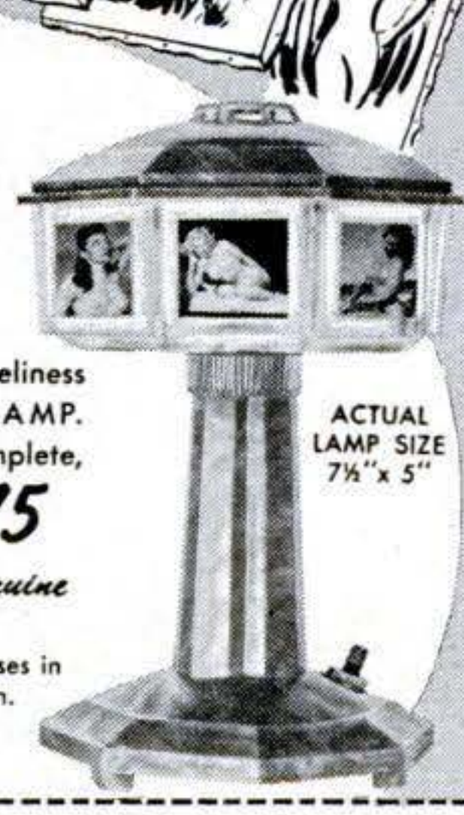
Tempting, tantalizing beauties posing only for you—the cream of all Artists' Models come to life in *Genuine* COLOR FILM . . . all their *natural* loveliness enhanced by the soft glow of this ART LAMP. The *thrill* of your lifetime—Lamp complete,

Only $6.75

including 8 *Genuine* COLOR FILMS.

Additional alluring poses in plastic mounts 60c each.

MAIL YOUR ORDER TODAY!

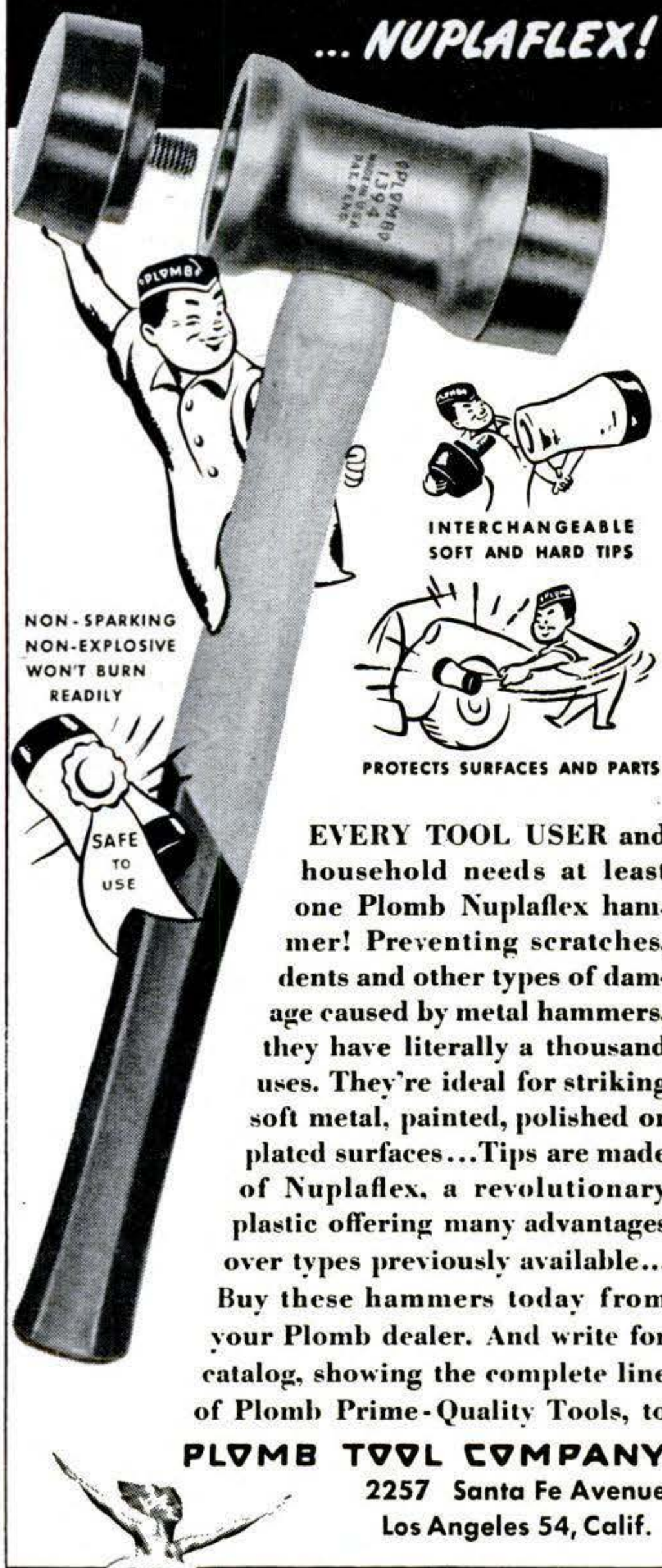


ACTUAL LAMP SIZE 7½"x 5"

NATIONAL NOVELTIES
141 No. La Brea, Hollywood 36, Calif.
Please ship_____ART LAMP(S) @ $6.75 complete with 8 poses.
☐ **Please send_____additional poses @ 60¢ each.**
☐ **Enclosed find ☐ check ☐ money order for $_____.**

Name_____
Street_____
City and State_____

NEW! Plomb's "1000-USE" Soft Hammers with the Miracle Plastic ... NUPLAFLEX!



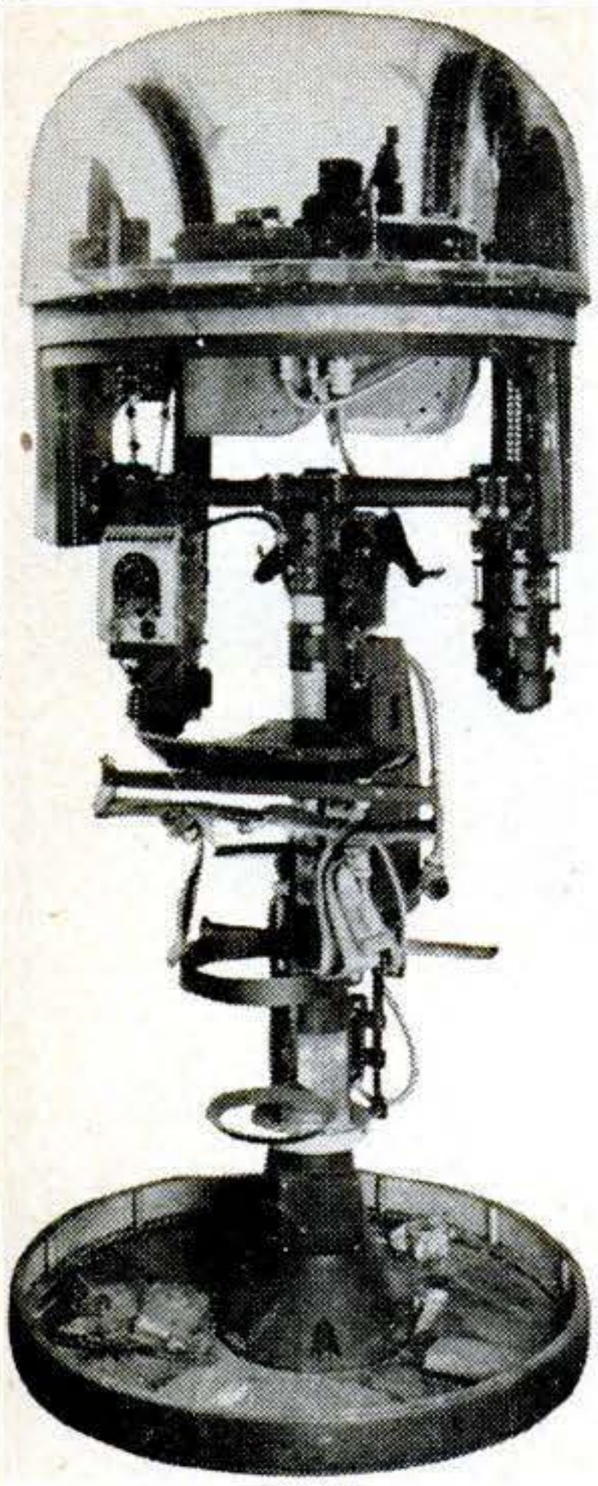
EVERY TOOL USER and household needs at least one Plomb Nuplaflex hammer! Preventing scratches, dents and other types of damage caused by metal hammers, they have literally a thousand uses. They're ideal for striking soft metal, painted, polished or plated surfaces...Tips are made of Nuplaflex, a revolutionary plastic offering many advantages over types previously available... Buy these hammers today from your Plomb dealer. And write for catalog, showing the complete line of Plomb Prime-Quality Tools, to

PLOMB TOOL COMPANY
2257 Santa Fe Avenue
Los Angeles 54, Calif.

4768

PLOMB *streamlined* **TOOLS**

Copyrighted material



A $2500 PIECE OF *Electrical and Mechanical Equipment* for

$25.00

GOVERNMENT SURPLUS

PILOT

Trainer

TURRET

3½ ft. in diameter
6½ ft. high

Chuck full of all kinds of gadgets, including:

2—1 H.P. Motors—Plexiglas Dome — Motorcycle Saddle—4-Lens Gunsight —Pistol Grip Controls—Oscillating Gun Mounts —Electric Trouble Lamp and 100 other attachments.

WHILE THEY LAST

$25.00

EACH

Approximate shipping weight—500 lbs.

IMMEDIATE SHIPMENT

Send Cash, Check, or Money Order to:

JOSEPH STERN

919 Union Central Bldg. Dept. 1 Cincinnati 2, Ohio

Save Money! **Protect Your Ignition Parts!**

SHORT-STOP

NEW IGNITION SEALER

Now you can avoid costly replacements in your ignition system by making parts thoroughly **moisture-proof.** No more shorting out due to rain, sleet, snow, excessive humidity, condensation or radiator overflow! All you need do is apply a small amount of **SHORT-STOP**—the new liquid ignition sealer—to exposed parts and you have full protection for a minimum of 6 months!

SHORT-STOP is guaranteed to protect your spark plugs, ignition wires, spark coil, distributor cap and base, generator, battery cables and terminals. **SHORT-STOP** has been **tested** by leading electrical laboratories and **proven** thru extensive use on automobiles, inboard-outboard motors, airplane engines, tractors, Diesel equipment, motorcycles, model airplanes and household motors.

Keep power in—keep moisture out . . . order your bottle of **SHORT-STOP** now! Send $1.00 for generous 4 ounce bottle. **MAIL COUPON TODAY!**

CARDINAL CHEMICAL CO., HAWTHORNE, NEW JERSEY

Please rush to me postpaid.....
bottles of **SHORT-STOP.** Enclosed is $.....

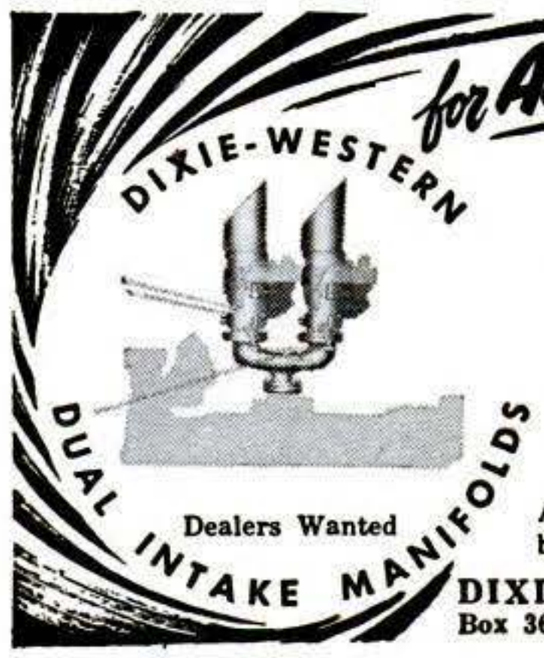
Name.....

Address.....

City.....Zone....State.....

---

for AMAZING acceleration



DIXIE-WESTERN

DUAL INTAKE MANIFOLDS for V-8 FORDS AND MERCURYS

$15.00 Gas Line and Throttle Kit $2.50 extra

Chrome Plated Velocity Stocks — $1.50 ea

By Test: Increased Acceleration by 26%
Increased Power and Speed by 11%

All DIXIE-WESTERN manifolds are brightly polished cast aluminum.

DIXIE-WESTERN MANIFOLD CO.
Box 364 • Los Angeles 43, California

BUILD YOUR OWN TRAILER

NEW AXLE AND WHEELS

IMMEDIATE DELIVERY

10% With Order—Bal. C.O.D.

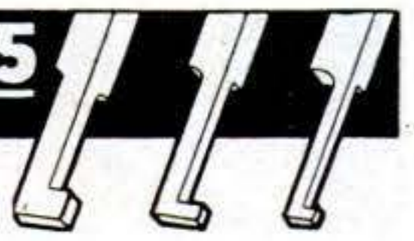
$26.35 Without Tires or Tubes

$58.00 With First Line 6:00 x 16 Passenger Tires and Tubes

- TIMKEN BEARINGS
- 59" TREAD—DEMOUNTABLE WHEELS
- 1½" SQUARE AXLE TESTED 4,000 LBS.
- 16" DROP CENTER WHEELS

STANDARD EQUIPMENT CO.
999 2nd Ave., S.E., Dept. P.S., CEDAR RAPIDS, IOWA

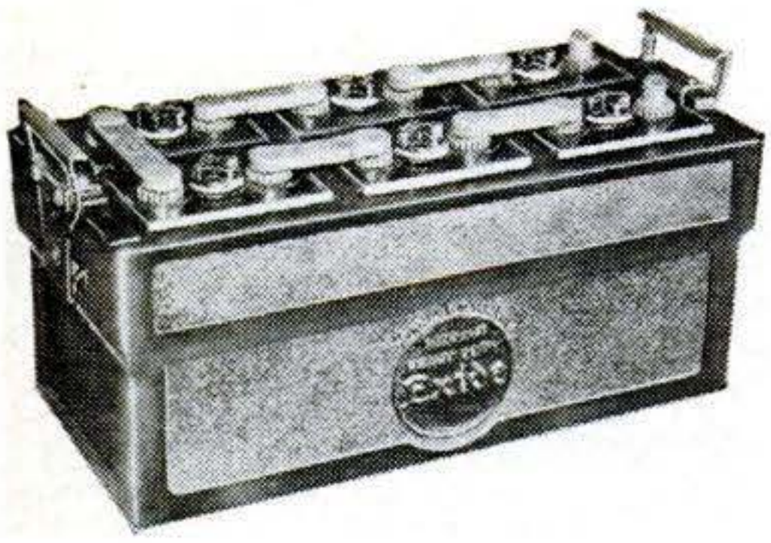
HIGH SPEED BORING BITS 1.25



5/16" square shank. Centrifugally cast with high Tungsten content and Chrome & Vanadium hardened to 64 Rockwell. Cutting Bit widths 3/16", 5/16" & ⅜", set of **three for $3.25** —Set of **12 for $9.75.** Send check, M.O. or cash for exact amount, we pay postage in USA. Satisfaction or money back.

S. S. GELBER CO. Dept. S-2, 441 So. Plymouth Ct. CHICAGO 5, ILL.

• NEW BATTERIES • for HEAVY DUTY USE



TRUCKS—TRACTORS—BUSES—DIESEL

EXIDE—12-volt-150 amp. hr.
21 plates-150 lbs.
$40 ea. f.o.b. Brooklyn

AUTOLITE-WILLARD & OTHER MAKES
6 volt-15 & 17 plates 175 amp. hr.
6 volt-25 & 27 plates-175 amp. hr.
$22.50 ea. f.o.b. Brooklyn

Each Battery In Perfect Condition No C. O. D.

WRITE—BENJAMIN'S for MOTORS

2124 Mill Ave., Brooklyn, N. Y.

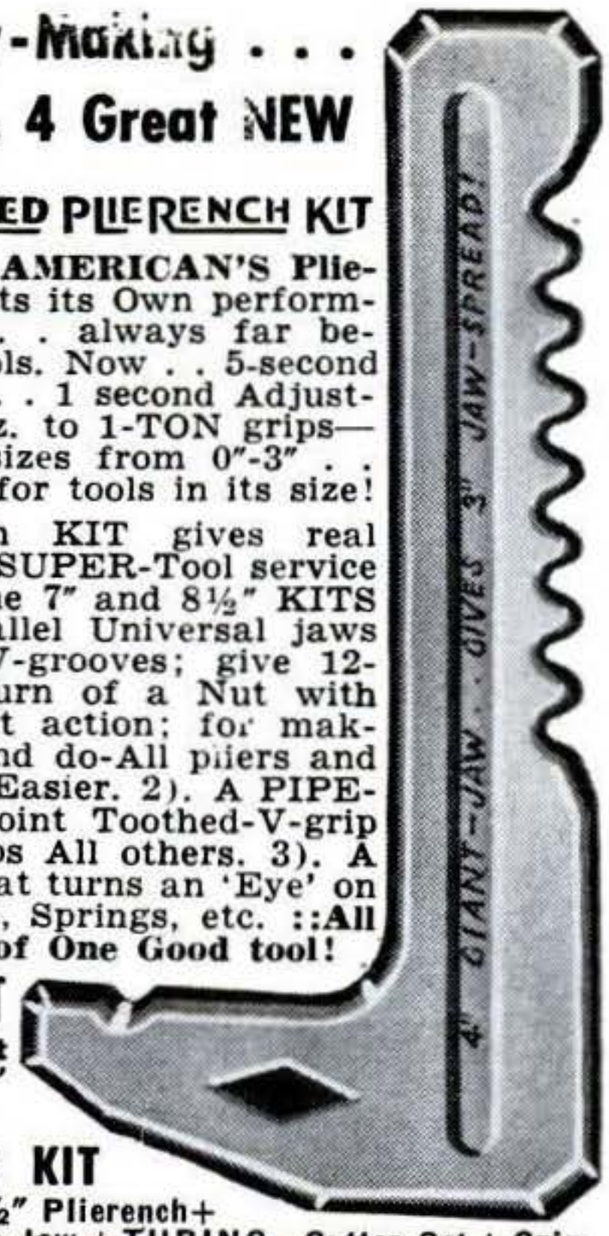
Copyrighted material

For . . . BIG Money-Making . . . Doing ALL Work . . . 4 Great NEW

EIFEL-GEARED PLIERENCH KIT

● **AGAIN . . AMERICAN'S Plierench** Kit Beats its Own performance Record . . always far beyond other tools. Now . . 5-second Jaw-Changes . . 1 second Adjustments . . 1-Oz. to 1-TON grips—in a Million sizes from 0"-3" . . as against 1" for tools in its size!

● A Plierench KIT gives real ALL-Purpose SUPER-Tool service . . Each of the 7" and 8½" KITS has: 1). Parallel Universal jaws with 4-way V-grooves; give 12-grips to a Turn of a Nut with Lock-&-ratchet action; for making Springs and do-All pliers and wrench work Easier. 2). A PIPE-Jaw with 4-point Toothed-V-grip that OUT-grips All others. 3). A WIRE-Jaw that turns an 'Eye' on ¼" Rod, Coils, Springs, etc. ::All for the Price of One Good tool!



The GIANT KIT is the 8½" Kit plus this 4" GIANT-Jaw.

THE MASTER KIT Comprises the 8½" Plierench + PIPE-Jaw + Wire-Jaw + TUBING—Cutter-Set + Grip-CLAMP and this 4" GIANT-Jaw . .

GET the Most Amazing Gripping-tool Facts Ever Printed

MAIL this Part of Ad TODAY on a Postcard will do . . Print Your address . .

Get **FREE**—the 115-Picture MANUAL-M and the 120-Picture CATALOG-C . . With BIG-Money-Making Offer for—Full-time DISTRIBUTOR ☐ . . Part-time AGENT ☐ Or . . User Offer ☐

NEW FREE

Bottle-Cap Opener, etc.

● Also **FREE** . . . this 3", 6-Edge, End-and-Angle, MULTITOOL — for Large and Small Screws in All positions and for countless useful jobs.

AMERICAN PLIERENCH CORP'N
4611 N. RAVENSWOOD AVENUE
DEPT PS-81, CHICAGO 40, ILLINOIS

Save Money FREE

KITS for Amateurs and Experimenters

RADIO CATALOG AND SUPPLEMENT

Build it yourself.

Thousands of radio values in this big book — Radios and radio phonographs, F.M., P.A., Ham Xmitters, receivers, kits, thousands of parts — whatever the job calls for Lafayette has it. And every item priced way down, to save you money!

RADIOS KITS HAM P.A.

Lafayette Radio
RADIO WIRE TELEVISION, INC.
100 Sixth Ave., N. Y. 13 • 542 E. Fordham Rd., Bronx 58
110 Federal St., Boston 10 • 24 Central Ave., Newark 2, N. J.

LAFAYETTE RADIO, Dept. KB-8
100 Sixth Ave., New York 13, N. Y.
Rush catalog #88 ☐ *Supplement #88S* ☐

Name.....
Address.....
City.....**Zone**.....**State**.....

SOLVES WOODWORKING PROBLEMS FAST!

Only 10¢
SPECIAL OFFER

● **This easy-reading GREENLEE HANDY CALCULATOR swiftly solves your woodworking problems. Just set the dial: convert linear feet to board feet; get slope per foot in degrees; compare hardness, weights, shrinkage, warping and working ease of various woods. More, too: bit sizes for head, body, thread of screws; nail specifications; tool sharpening hints; protractor. 6" diameter, fits your tool kit. Heavily varnished cardboard. Special offer. Order now, send 10¢ (not stamps) in next mail. Greenlee Tool Co., 2122 Columbia Ave., Rockford, Ill.**

TOOLS FOR CRAFTSMEN
GREENLEE

Copyrighted material

NEW—*Army Surplus*

ELECTRIC MOTORS

24 Volt...AC-DC., Ball Bearing

1/6th H.P. 6350 R.P.M.

1/10th H.P. 3600 R.P.M.

1/11th H.P. 3600 R.P.M.

1/12th H.P. 6000 R.P.M.

1/20th H.P. 3900 R.P.M.

3 1/2 H.P. 24V. D.C. ONLY

ORDER TODAY YOUR CHOICE **$2.95** EACH

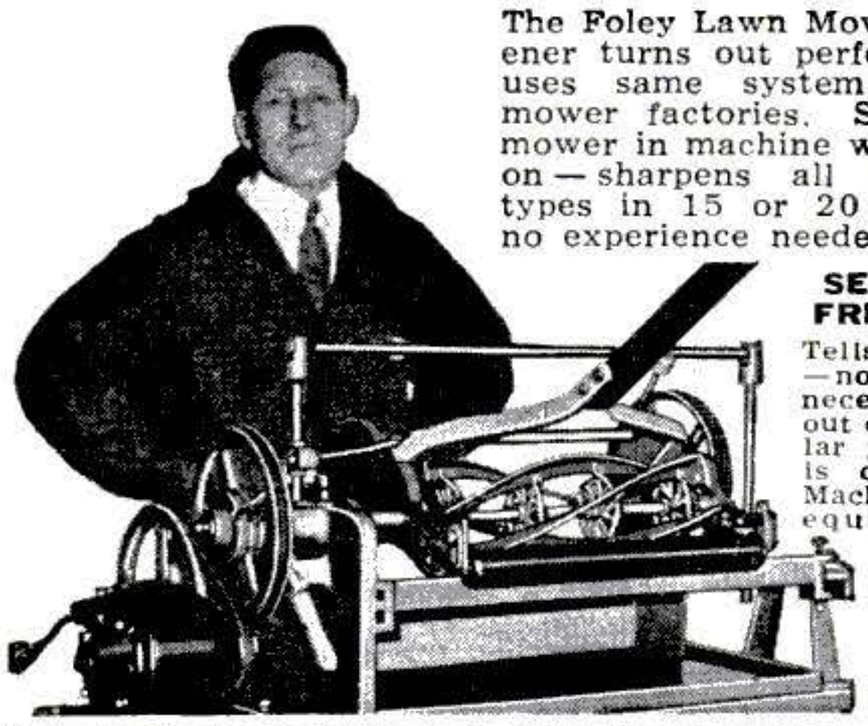
All prices F.O.B. Detroit. Send cash or money order. No C.O.D.'s—Orders shipped by railway express.

RADIO CENTER
2530 E. DAVISON
DETROIT 7, MICH.

This Is the Way To Make MONEY!

"MADE $1,025.00 IN 9 MONTHS"—says W. A. T.—"and a substantial increase each year proves beyond any doubt that Foley Lawn Mower Sharpeners do very satisfactory work." J. L. V. made as high as $100 a week clear profit. C. A. B. says: "Am doing fine—paid for my machine in 4 weeks." These men (names on request) know that as the grass grows, it grows profits for them!

REPEAT CASH BUSINESS—PART OR FULL TIME



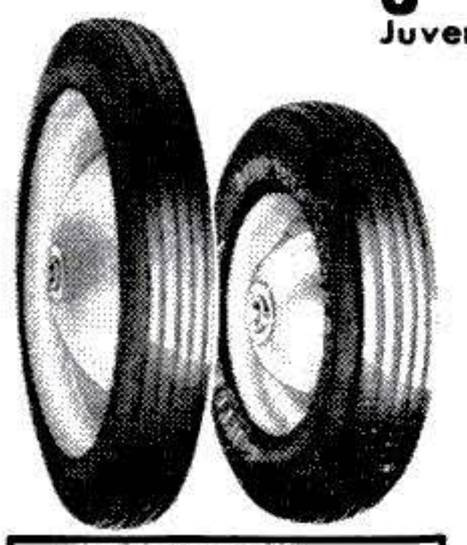
The Foley Lawn Mower Sharpener turns out perfect work—uses same system as lawn mower factories. Simply put mower in machine with handle on—sharpens all sizes and types in 15 or 20 minutes—no experience needed.

SEND FOR FREE PLAN

Tells how to start—no canvassing necessary. 99c out of every dollar you take in is clear profit. Machine comes equipped with motor—and is available immediately. Send coupon now!

FOLEY MFG. CO., 208-8 Foley Bldg., Minneapolis 18, Minn.
Send FREE PLAN on Foley Lawn Mower Sharpener business.
Name.....
Address.....

Ball-Bearing SPEED WHEELS



DEALERS WANTED

Juvenile wheels, solid tire—No Bearings
7" wheels.....60c
6" wheels.....50c
4" wheels.....30c

Semi-pneumatic tired wheels
12 x 1.75".....$3.25
10 x 1.75".....$2.75
10 x 1.25".....$2.00
8 x 2".....$2.00

Industrial wheels for heavy loads
Semi-Pneumatic
400 x 8, 2 ply tire and tube $12.50
10 x 2.75".....$6.75
10 x 2.75" Single Tube.....$7.25
12 x 3.00 wheel bolted hub $9.75
8 x 1".....$4.90
6 x 2".....$2.80

Free blueprints with all wheel orders.
Send check with order. Shipments f.o.b. Akron.

JIM BROWN TOY COMPANY
1093 Home Ave. Akron 10, Ohio

GARDEN TRACTORS

SPEEDEX AT BIG SAVINGS

P-1047-32

12 Years proved service on large and small acreage. Complete line of implements to fit.

WRITE FOR FREE BOOKLET

POND GARDEN TRACTOR COMPANY
BOX 216 RAVENNA, OHIO

Assemble KING MIDGET

Practical highway racer runabout. We supply all parts. Just bolt together. Low cost. Ready for delivery NOW. One or two cylinder 40 m.p.h., 45 to 50 on ice or snow with skis, up to 100 miles per gallon. Send 25c for complete literature with large picture, 4-view drawings, price of parts, or send $1 (refunded with first order) for the above, plus 24-page assembly book with 42 photographs and drawings; blueprints for converting for use on ice and snow, etc.

MIDGET MOTORS Athens, Ohio

SPECIAL BARGAIN PRICES IN

SETS OF CARBON TAPS & DIES

consisting of one each of tap & die 1/72, 2/64, 3/48, 4/48, 5/40, 6/32, 8/36, 10/32, 12/24, (dies 13/16 O.D.) complete with Tap Wrench and Die Stock. **COMPLETE $8.00**

Write for prices & Sizes of individual taps & dies. Enclose 3c for postage.

SEND FOR FREE CIRCULAR

SID TOOL CO. Dept. S1, 183 Grand Street, N.Y.C.

New! Navy Foul-Weather

JACKETS

Made of water-repellent heavy jungle cloth, warmly lined with alpaca and alpaca collar. Zippered front with button flap over zipper, and drawstring at waist. A perfect jacket for work or sport. Sizes 36, 38 and 40 . . . **$12.45** postpaid.

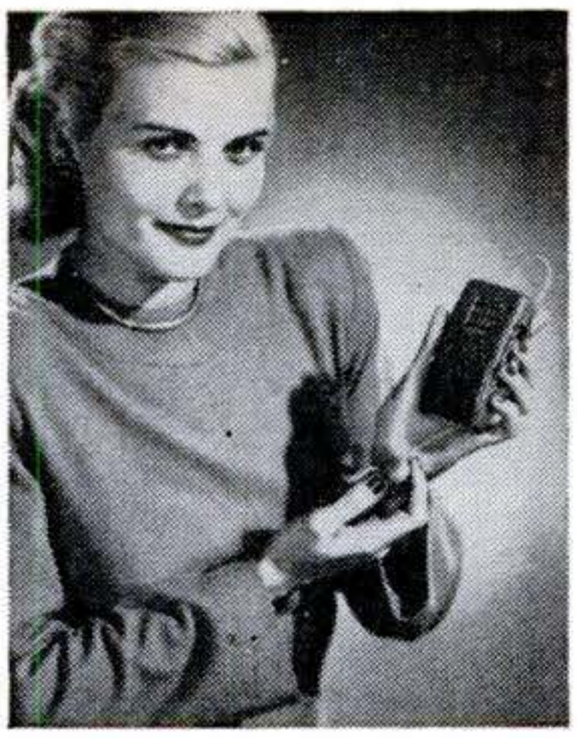
BLUE NAVY Foul-Weather Jackets Wool-lined. Sizes 46, 48 and 50 . . . **$12.45** postpaid.

Write for FREE 1948 CATALOG!

Send Check or Money Order

PACIFIC FUR & WOOL CO.
War Surplus Dept. Box 926-PS Sacramento, Calif.

Copyrighted material



DEAFENED? LEARN WHY THOUSANDS RECOMMEND THESE NEW *Western Electric Hearing Aids*

NEVER BEFORE in Western Electric's long history as a maker of hearing aids has there been such immediate acceptance for newly announced instruments. Here's why:

FOR THOSE WITH MODERATE HEARING LOSS

The compact *all-in-one* MODEL 65 weighs only six ounces, including self-contained batteries. It brings out with particular clarity the all-important speech range of sound. Send coupon for more details.

FOR THOSE WHOSE HEARING LOSS IS SEVERE

All-in-one SUPER 66 users confirm laboratory reports that it is the finest hearing aid ever designed by Bell Telephone Laboratories. It supplies extra power to those who need it, superb fidelity over a wide tonal range.

Free! **MAIL THIS COUPON TODAY**

Send me, free, the new booklet, with details on Model 65 and Super 66. Also enclose my free copy of the helpful new book, "Modern Science and Your Hearing."

Western Electric, Dept. 380-PS2—195 Broadway, N. Y. 7, N. Y.

Name_____

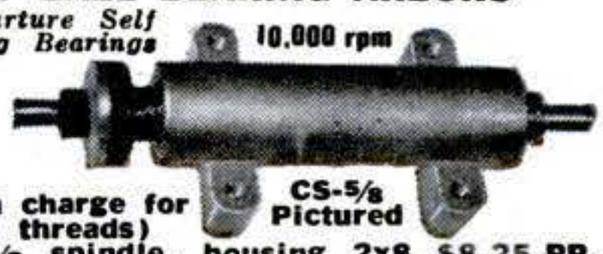
Address_____

City_____ Zone____ State____

BUILD YOUR POWER TOOLS

WITH OUR GUARANTEED INDUSTRIAL POLY BALL BEARING ARBORS

New Departure Self Lubricating Bearings



10,000 rpm

CS-5/8 Pictured

(No extra charge for left hand threads)

C4-1/2x12 1/2 spindle, housing 2x8 $8.25 PP.
C5-5/8x12 1/2 spindle, housing 2x8 $8.25 PP.
C6-3/4x12 1/2 spindle, housing 2 1/4x8 $9.25 PP.
D8-1x17 1/2 spindle, housing 2 5/8x11 $17.00 PP.
1 INCH BETWEEN WASHER AND COLLAR

B33—$4.95 PP
5/8x4 1/2 Spindle
B15 Plain Spindle
$3.50 PP.

SHAPER ARBORS 3 inches between collars, C4-1/2 $14.25, C5-5/8 $14.25, C6-3/4 $15.25, D8-1 $23. **B25**-Y2x2" cap. Flange Mount. **$5.50**
SPECIAL SAW ARBOR Lengths for Y2, 5/8, 3/4, add **$1.50**

POLY PRODUCTS, 2032-B E. Walnut, Pasadena 8, Calif.

Say You Saw It In Popular Science

LABORATORY MICROSCOPE

600 POWER $22.50

3 Objectives—75X, 300X, 600X

A professional type microscope priced within the reach of the amateur. For school, laboratory, physician, and student. Color corrected achromatic lenses. Professional size eyepiece and objective interchangeable with all standard professional makes. Height 14 inches. Weight 5 1/4 lbs. Stage 4"x4". 2 wheel focusing. Body tilts any angle. Microscope complete with 3 objectives, prepared specimen slide, and 96 page book on microscopy, only $22.50.

We pay the postage. Immediate delivery. Money back guarantee.

BROWNSCOPE CO.

Dept. 2P, 24 West 45th St., New York 19, N.Y.

New VISE-GRIP WRENCH

New Thin-Nose VISE-GRIP wrench has new Involute Jaw Curve, Knurled Jaw Tips and powerful Wire-Cutter. It's the world's most complete hand tool!

Locks to the work with Ton-Grip. Holds anything, any shape, with non-slip grip. Easy to open. Adjusts to ratchet action. Fine alloy steel.

SEE YOUR DEALER *With* cutter—7" $2.25; 10", $2.50.
Without cutter—7", $1.85; 10", $2.25.

PETERSEN MFG. CO.

Dept. E2 **DeWitt, Nebr.**

Copyrighted material

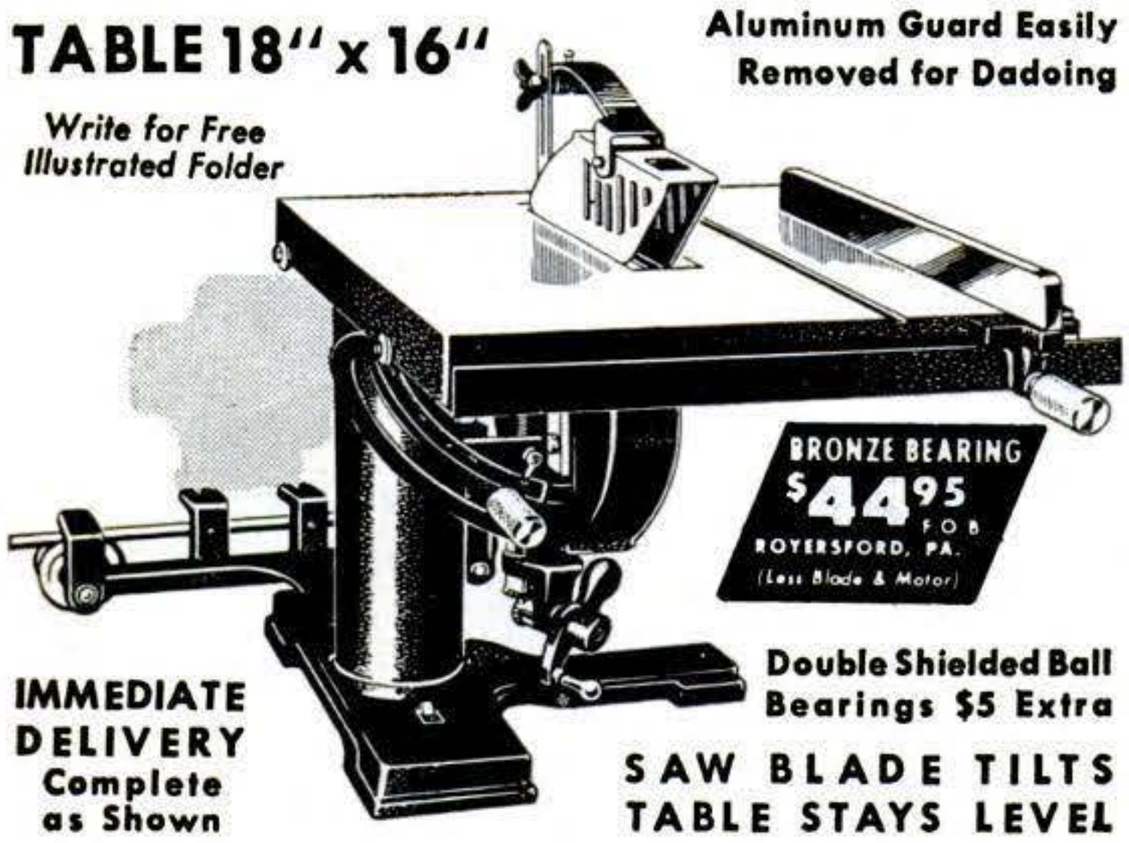
MP TABLE MODEL TILT-ARBOR SAW

OIL IMPREGNATED BRONZE BEARINGS OR DOUBLE SHIELDED BALL BEARINGS, BOTH WITH THE PATENTED BALL BEARING TRANS-AXIAL MOTOR DRIVE

TABLE 18" x 16"

Aluminum Guard Easily Removed for Dadoing

Write for Free Illustrated Folder



BRONZE BEARING $44.95 F.O.B. ROYERSFORD, PA. (Less Blade & Motor)

Double Shielded Ball Bearings $5 Extra

IMMEDIATE DELIVERY Complete as Shown

SAW BLADE TILTS TABLE STAYS LEVEL

MODEL #2021 AS SHOWN WITH COMPLETE MITRE GAUGE. Precision etched scales show angles on mitre gauge and saw cradle. STEEL BAR RIP FENCE. ALUMINUM SAW INSERT AND GUARD. STEEL SPLITTER. BALL BEARING TRANS-AXIAL DRIVE 5/8" GROUND ARBOR. "COMPO" OIL IMPREGNATED BRONZE BEARINGS WITH OIL CHAMBER AND CUP, OR, DOUBLE SHIELDED BALL BEARINGS, $5 EXTRA. TABLE 18" x 16". BUILT IN SWITCH. Depth of Cut 2 5/16". Shipping Wt. 90 lbs. Requires 1/3 or 1/2 H. P. Motor.

AMERICAN MACHINE & TOOL CO., Inc.

DEPT. 20, ROYERSFORD, PA.

32 DRAWER UNIT $4.95

64 DRAWER $7.95

for home or shop

THE JIFFY all metal CABINET

THE HANDY WAY TO KEEP SMALL PARTS, WASHERS, NAILS, SCREWS, NUTS, BOLTS AT HAND

DRAWER SIZE
1 1/4" Deep
3" Wide
6" Long

CABINET SIZE
32 Drawer Unit
6" Deep
12 3/4" Wide
15 1/4" High
Shipping Weight 9 lbs.

64 Drawer Unit
6" Deep
25 1/2" Wide
15 1/4" High
Shipping Weight 18 lbs.

For small items, the low-cost Jiffy Cabinet, 32 or 64 drawer units that put office, shop, work bench, household and hobbyist needs at your fingertips. Metal flange drawer guides. Spot welded all metal cabinet with sturdy laminated drawers insures long time-saving service. Why fumble? With the Jiffy you know where it is. 32 drawer unit—$4.95; 64 drawer unit—$7.95. Send check or money order—No C.O.D.'s please. Ohio orders please add 3% Sales Tax.

KAYTEE PRODUCTS

Dept. S • Box 588 • Canton, Ohio

save MONEY ON ALL STANDARD BRAND CIGARETTES

LUCKIES — CHESTERFIELDS
CAMELS — PHILIP MORRIS
OLD GOLDS — PALL MALL
and others

$1.41 CARTON 10 PACKS

SHIPPED SAME DAY

TO ANY PART IN U. S. OR ABROAD ON RECEIPT OF CHECK OR MONEY ORDER

PERFECT ARRIVAL GUARANTEED!

Minimum 3 Cartons • Include Postage and Insurance as follows: Within 150 Miles • For 3 Cartons 15¢ • Add 1¢ for each additional carton • Distant Orders Require Extra Postage.

WE CARRY A COMPLETE LINE OF POPULAR BRANDS OF CIGARS—Write for Price List

Prices subject to change without notice

OUR 28th YR. • 100,000 SATISFIED CUSTOMERS

SILVER ROD SALES

DEPT. A, JERSEY CITY 6, N. J.

FLOYD CLYMER'S unbiased book

"INDEPENDENT TEST REPORT ON KAISER-FRAZER CARS"

Read what 3000 owners now think of their K-F cars. Expert, part-by-part analysis. 100 photos. Tells all. 3000-mile test run, Pike's Peak closed car record, gas mileage. Thousands are buying. Order now. $1.50 postpaid. $2.50 deluxe ed. Cash, money-order, or specify C. O. D. Money-back guarantee. Clymer, Publisher, Dept. PS-2 2125 W. Pico, Los Angeles 6, Calif.

Saves Time, Effort, Money in

APPLIANCE REPAIRING!

New Model "60" checks all appliances. AC ammeter range 0-15 Amp. Serves as wattmeter. High sensitivity neon tube. Checks thermostats. Tells instant it cuts in or out. Is all 'round trouble shooter. Only $14.50 complete.

***FREE** with each tester. New Complete Practical Course in electrical appliance repairing. Write for circular.*

HANLAN CO., 1419-B, West Jefferson, Los Angeles 7, Calif.

BUILD YOUR OWN ZEOLITE WATER SOFTENER

You can do it inexpensively with only a wrench and a little spare time. Same Zeolite process as used by other leading water softeners. Send $1 for easy-to-follow directions and list of materials. (We can supply most of the materials.) Your money back if not satisfied.

LAKE REGION MFG. CO., 4184-B Xenwood Ave., Minneapolis 16, Minn.

LIGHT PLANTS

Used Gov't Surplus—Lowest Price Ever Offered—3,000 watt, 110 volts.

Powered by Briggs-Stratton or Wisconsin 6 H.P. air-cooled engine. For stationary or portable use. REBUILT-GUARANTEED, good mechanical and operating condition. Our price F.O.B. Kansas City.... **$149.50**

Limited Supply—Immediate Delivery—Order Now
Write for Illustrated Circular

MIDWEST SURPLUS SALES 1520 LOCUST ST. KANSAS CITY, MO.

Copyrighted material

$14.95 NEVER BOUGHT SO MUCH IN A POWER TOOL

New 22-piece CASCO Electr-O-Tool Kit

Puts 1001 Skills at Your Fingertips

Here's what every hobbyist, home craftsman and mechanic has been waiting for! CASCO Power Tool is actually a complete, portable workshop. 18 easily installed accessories instantly transform it into a dozen different, useful tools that handle like a pencil. Powerful motor is air-cooled in shockproof, unbreakable Tenite case. Exclusive finger grip permits closer work; on-off switch permits one-hand operation. Quiet; smooth-running; efficient; vibrationless high speed. Operates AC-DC. At leading stores everywhere.

POWER TOOL COMPLETE WITH 20 ACCESSORIES, KIT AND PROJECT BOOKLET ONLY $14.95 — IF BOUGHT SEPARATELY YOU'D PAY $23.45

CASCO

Another good buy: Casco Electri-Craft—has 36 accessories and extra sturdy steel storage chest—$32.95 if purchased separately—an outstanding value at $22.50.

CASCO PRODUCTS CORPORATION, BRIDGEPORT 2, CONN.

VEST POCKET SIZE!

WORLD'S LOWEST PRICED ADDING MACHINE

Fits vest pocket or purse. Guaranteed Accurate. Operated as easily, and as reliable, as machines costing many times as much. NOT A TOY OR GADGET. Precision made—very durable. Guaranteed for life against defects in construction. Beautiful looking, modernized design. Finished in silver with black numbers and red slides.

You positively can't buy a Calculator of equal quality for as little money. ACCEPTED AS THE FINEST LOW PRICED CALCULATOR FOR OVER 35 YEARS! Now completely redesigned and improved.

BETTER THAN EVER BEFORE! Operates with a flick of your finger. Adds, subtracts, multiplies, divides—counts up to one billion. Pays for itself over and over in mistakes avoided, and time saved.

MAKES IDEAL GIFT

Baby Calculator makes an ideal gift for every Gift occasion. Birthday—Graduation — Christmas — Anniversaries. For men, women, children — teachers, business people, home or shop use. **COMES PACKED READY FOR GIFT WRAPPING.**

TEN DAY TRIAL

Money Back Guarantee

Because we know that our machine is the very best calculator to be obtained at this low price, we make this 10 Day Trial offer on a positive money back guarantee!! Don't buy ANY Calculator without this guarantee! Send only name and address, pay postman $2.95 plus postage (if cash is sent, we pay postage) —you save up to 40c. (Send full cash if outside U. S.) Money back within 10 days if not delighted.

AGENTS WANTED

CALCULATOR MACHINE CO., (Mfrs.)

DEPT. 487, P. O. Box 248 GLENVIEW, ILL.

Free Trial

Each Baby Calculator enclosed in beautiful rich-looking Leatherette Case — at no extra cost.

ONLY $2.95 TOTAL COST

SEND NO MONEY

USE COUPON

CALCULATOR MACHINE CO., (Mfrs.)
P.O. Box 248, Dept. 487, Glenview, Ill.
Your Calculator is just what I've been looking for. Send one at once (C.O.D.) or (I am enclosing $2.95).

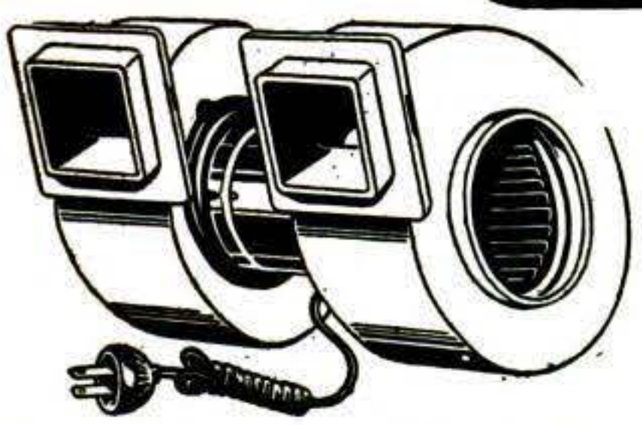
Name. .....

Address . .....

City.....State.....

Copyrighted material

CAST ALUMINUM DOUBLE EXHAUST BLOWERS $15.85



For COAL FURNACE BLOWERS (Save 31% on Coal Bill)—AIR CONDITIONERS — HUMIDIFIERS —DARKROOM DRIERS— LABORATORIES—WORKSHOPS — HOSPITALS — LAUNDRIES — OFFICES — PRINTERS.

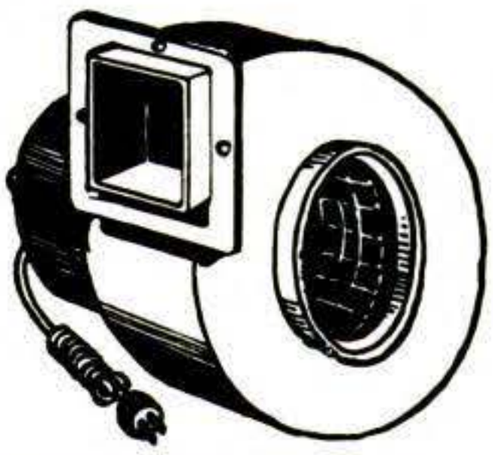
Double intake and exhaust from 2 balanced sirocco type wheels. Will easily solve your forced draft and fresh air problems. Blower designed especially for quick and simple installation. Anyone can do it with ordinary household tools. Blower housing is heavy cast aluminum to last indefinitely. Cont. duty motor is extraordinarily quiet. 110 V., A.C., 50-60 cycles. Cord attached, ready to plug in.

SINGLE EXHAUST BLOWER

While they last! Our famous single exhaust blowers DELIVER 100 CU. FT. AIR PER MINUTE. Ready to install yourself with any household tools. It's built for that! 110 V., 50-60 cycles. Cont. duty motor.

NOW! ONLY $10.00

Send check, money order. West of Mississippi add $1.00 for mailing, handling. IMMEDIATE DELIVERY. Service men and dealers: Inquire about quantity discounts.



NOW attractive, sturdy chests for neat storage of tools and small items

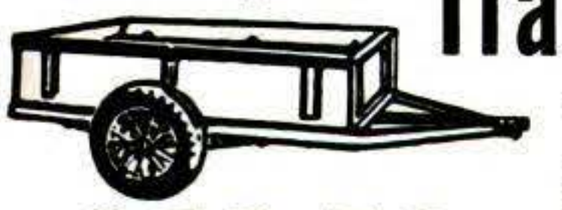
Ideal for your shop and all around the house . . . well-built with smooth-working drawers. Sanded, primed—ready to paint or stain. Tool Chest has four drawers from 1⅝" to 3" deep. Handy Parts Chest has four drawers 2" deep with removable dividers to make from 3 to 14 compartments per drawer. Order now —send check or money order (no C.O.D. please) —we pay shipping charges.

GREEN BROS. BOX CO.
P. O. Box 437
Rockford, Illinois

Tool Chest 17½" wide, 10¾" deep, 12" high. For your hand tools. **$6.45**

Handy Parts Chest 14" wide, 12½" deep, 14½" high. For nails, screws, etc. **$6.95**

Greatest Buy Ever! Trailer Chassis



$52.50
F.O.B. Yonkers

Here's what you get—All steel chassis, Welded joint reinforced with steel plate for sturdy construction. Draw bar extends under body. 2 Standard type auto springs; with swivel joint shackle and fixed shackle. 2 Wire spoke wheels (that take standard 4.75 19 tires) 4 timken roller bearings, 2 dust caps, bolts for assembly. Knocked down, less body and tires.

ALL STEEL COMMERCIAL BENCH LEGS

By simply placing boards across the top, you have a bench or table. Provides cross bars for adjustable shelves. Add ply-wood doors to shelves and you have a cabinet. O.D. 24"x30"-2¾" chanel steel. Finished in gray. You'll find many uses for these legs.

$4.75 ea. F.O.B. Yonkers

Minimum order 2 Legs

UNIVERSAL YONKERS CORP. (Dept. S-2) 137 Alexander St., Yonkers 2, N. Y.

GIANT Astronomical Telescope

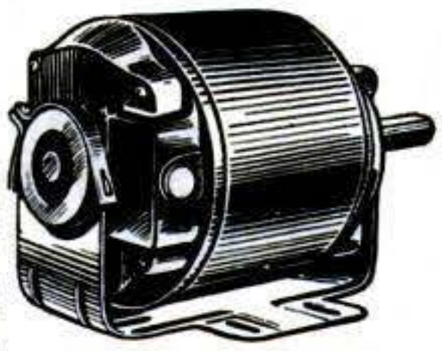
100 diameters magnification. (10,000 area magnification) 3 inch diameter steel main tube 50 inches long. Brass focusing tube. Tripod 6 feet high. Equatorial mounting. Ready to set up and use. Full power and clear vision guaranteed. Price $15.00. 20% deposit on C.O.D. orders.

DEPT. BT, SUFFOLK SCIENCE SERVICE, MANORVILLE, N. Y.
"NO EXPORT ORDERS ACCEPTED"

NEW POST WAR HEAVY DUTY MOTOR

1/3 H.P. G.E.
60 cycle
115 Volt A.C.

Special **$21.95**



This is not war surplus, but brand new postwar heavy duty G.E. motor with rubber mounted base. Powerful for drill presses, saws, lathes, air compressors, etc.

Extra heavy duty motor, ½ HP $39.95

Shipped Railway Express. Check or Money Order. COD Orders $5.00 deposit.

GENERAL AIRE CO. 447 W. Norris St. Phila. 22, Pa.

Pat. Applied for

Rotary Garden Tillers and Tractor Power Take-Off Units

FIRST CHOICE BECAUSE IT'S GUARANTEED to Increase Crop Yield 22% to 51%

M-E Rotary Tiller

Does All This with LESS Work!

Prepares perfect seed bed . . . increases mineral and moisture content . . . *rebuilds* soil Nature's way. M-E makes work easier . . . does it better . . . than any other equipment you can buy. Write today!

ROTARY TILLERS
REBUILDS SOIL — NATURE'S WAY
Milwaukee Equipment Mfg. Co., So. Milwaukee, Wis., U. S. A.

Milwaukee Equipment Mfg. Co.
Dept. PS-2, So. Milwaukee, Wis.
Please send illustrated folder.
Name
Address

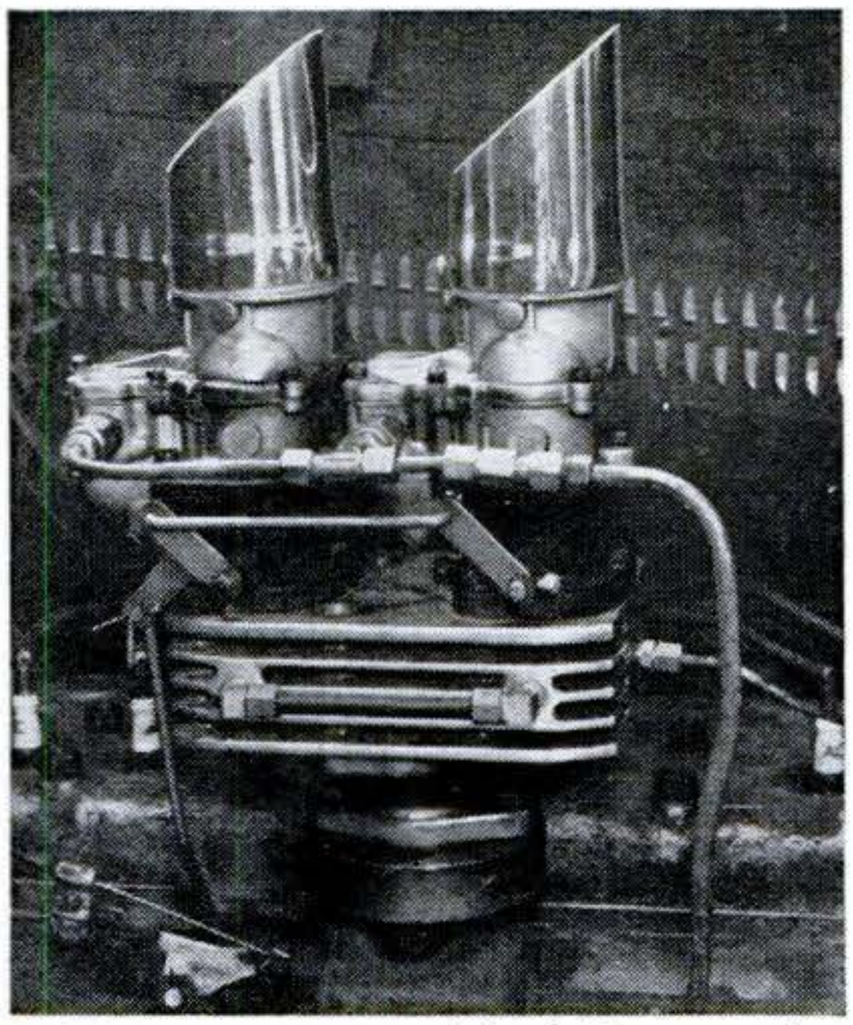
Copyrighted material

Sensational MANI-DAPTOR

TWIN CARBURETION UNIT

Available for installation on any car with down-draft manifold.

• POWER • SPEED • ECONOMY



The Mani-Daptor steps up your motor's efficiency by approximately 20%—it puts to work horsepower that has been lying idle. The firing order is at no time affected by fade-outs and yet you save on gas! More high gear driving, more pick-up and quicker, more economical driving is attained with the Mani-Daptor.

POWER & SPEED. A 33 Ford V-8 (stock) was clocked at a top speed of 72 mph. With a Mani-Daptor installed it was clocked at 96 mph. There is a marked increase in power and speed in every car or truck equipped with the sensational, new Mani-Daptor.

ECONOMY. One Chevrolet owner reports a mileage increase from 16 to 23 miles per gallon. Top speed increased 20 mph. Due to increased performance with the Mani-Daptor, engine repairs and upkeep were cut to a minimum.

DEALER OR DISTRIBUTOR INFORMATION ON REQUEST

NOW AVAILABLE! Mani-Daptors for immediate installation, complete with linkage and easy-to-follow instructions.

8 cylinder cars $26.50 postpaid

6 cylinder cars $32.00 postpaid

Stacks & carburetors extra

LES B. BACKUS
10617 Prairie Avenue
Inglewood, California

ORDER NOW

Orchard 7-8545

Please rush a Mani-Daptor unit for a..... make ..... model ..... cylinders

Prepaid..... COD.....

Name.....

Address.....

City.....Zone.....State.....

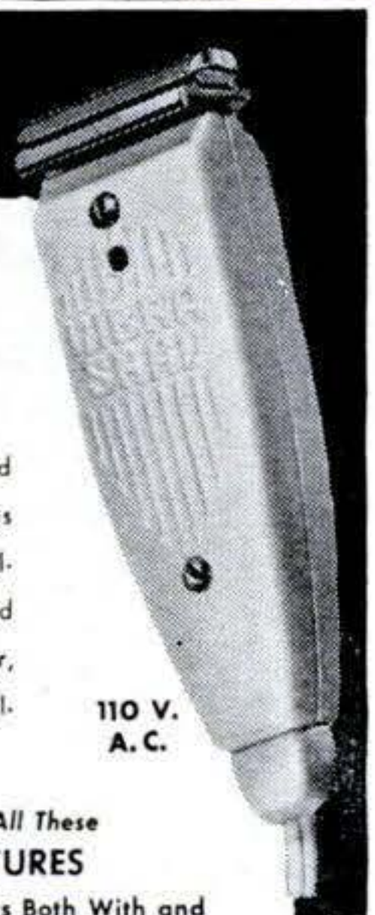
SEND INFORMATION ON HIGH SPEED EQUIPMENT

IT'S DIFFERENT!

Vibra-Shav

The ELECTRICALLY POWERED SAFETY RAZOR

WITH WHISKER *SLICING* ACTION



Better than a dry shaver — shaves closer, faster, and in any weather. Better than a safety razor — slices whiskers off clean instead of pulling; leaves face feeling fresher, not burned or irritated. Uses any standard double-edge blade — blades last 2 or 3 times longer, are easily changed. Complete with handsome, all-plastic carrying case, 6-foot cord and plug.

110 V. A. C.

No Other Razor Gives You All These

EXCEPTIONAL FEATURES

- Slices Whiskers Both With and Against the Grain of Your Beard
- Gives You a Gentle Massage While Shaving
- Blades Last Two to Three Times as Long
- Convenient, Durable Carrying Case
- 7200 Shaving Strokes Every Minute
- Use Your Choice Shaving Cream—Your Favorite Double-Edge Blade
- Quiet Performance — No Radio Interference

★ EVERLASTING SERVICE GUARANTEE

ONLY $6.95 post paid

Write to VIBRA *Corporation*

6651 ENRIGHT AVENUE — ST. LOUIS 5, MISSOURI

Road Gripper

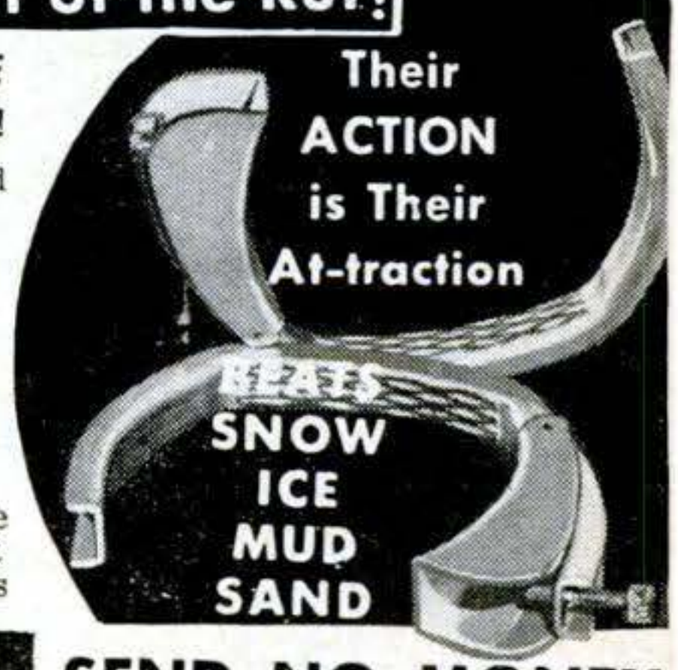
AMAZING NEW INVENTION

Gets You out of the Rut!

EASY — QUICK — SURE

Saves a "Million" Headaches!

SNOW KING "road grippers" come to fit all popular tire sizes. SNOW KINGS are made of rustproof steel and shaped to fit the contour of your tire. Slide over tire, turn adjusting screw forcing clamp firmly against side wall, and you'll pull out of a rut like "nobody's business." Send check or money order for one



5 DAY TRIAL

SEND NO MONEY

DEALERS
Write to
CHRISTIAN BUEHLER
122 S. Michigan Ave., Chicago, Ill.

BUFFUM AND COMPANY
333 N. Michigan Ave., Chicago 1, Ill

Rush 2 **SNOW KINGS** on 5 day Trial ( ). I enclose $3.95 ( ) Ship C.O.D. Tire Size...

NAME .....

Street .....

City .....(B-2)

Copyrighted material

Now a DYNAMIC Industrial Transformer Type Super Charged WELDER

FOR AUTO, HOME APPLIANCE AND FARM REPAIRS

DESIGNED TO DO HIGH GRADE WELDING *inexpensively*—Maintenance Men, Farmers, Mechanics, Machine Shops, Foundries, Auto, General Repair and Job Welding Shops, all using the DYNAMIC find it so indispensable and useful that they can't afford to be without it. **EASY-TO-OPERATE.** If inexperienced you can easily learn to do a variety of high grade welding jobs by following the practical, *simplified Welding and Operating instructions furnished.* Once you see the DYNAMIC in operation you won't want to be without it. Its simplicity will amaze you. In a year the DYNAMIC only costs you about 7c a day. Comes complete ready to operate with helmet, rods, cable, holder, operating and welding instructions, etc.

Saves You Valuable Time and Money!

This **portable,** industrial transformer type *Dynamic Welder* easily carried right to the job can be operated from **any convenient** properly wired **110 Volt 60 Cycle Line. WORKS on IRON, STEEL, BRASS, BRONZE and Other Metals.** Has 8 metallic and carbon arc heat stages. Does work you would think only possible with a larger more expensive machine ... Can also be supplied for 220 VOLT 60 CYCLE operation and other voltages and cycles at slight additional cost.

FOR ONLY **$28.50** COMPLETE

DO YOUR OWN WELDING

Just a few repair jobs will pay for this machine. A practical and profitable machine tool for any workshop. Make money doing repair work for others.

Write for Particulars

Get Details on our 10 day Trial Offer

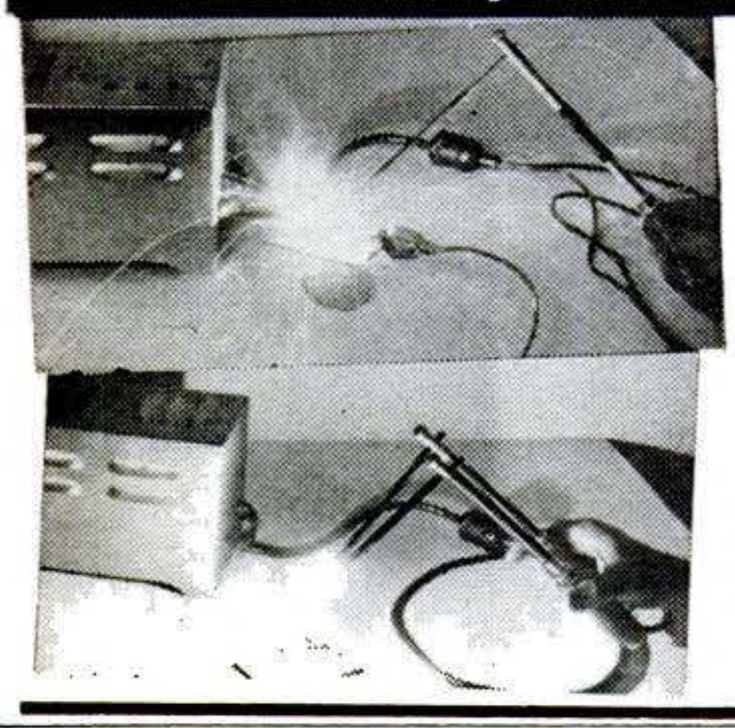
Member Chicago Association of Commerce.

DYNAMIC WELDER CO., 15 East 23rd Street, AD, CHICAGO 16, ILL.

LOWEST PRICE IN HISTORY!

Sensationally New *WELDRITE* Electric Welding-Cutting Torch

NOW ONLY **$12** FULLY GUARANTEED



Plugs into any convenient AC-DC Socket

WELDS - BRAZES - CUTS - MELTS - SOLDERS - HEAT TREATS

The WELDRITE Torch—tested and proven by countless commercial and amateur users, is now offered direct to you at the amazingly low price of only $12.00. No Gas—No Gauges—No Spark Lighter needed. Always ready for immediate use—Just plug WELDRITE into any 110 AC or DC outlet. Uses standard welding and brazing materials available at all welding supply stores. WELDRITE furnished complete with Converter Unit, Single Holder with attached Alligator clip, for Welding metal up to 3/16" thickness, using up to 3/32" rod, and Double Holder with Carbon-Tipped Dual Copper Electrodes for Cutting, Brazing, Heat Treating, Soldering, etc. Supply of welding materials included free.

Ideal for home workshop. Invaluable for body and fender shops, garages, repair and machine shops, manufacturers, etc.

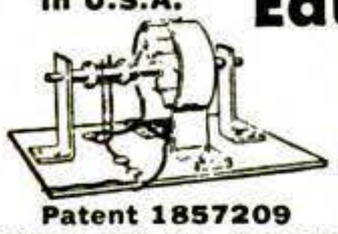
SEND NO MONEY. Order your WELDRITE Electric Welding-Cutting Torch today. Pay postman $12 plus postage charges (wt. 4 lbs.) or send $12 and we pay postage. Either way, if not satisfied, return WELDRITE in 5 days, and money will be refunded. California orders please add sales tax.

CALIFORNIA TECHNICAL PRODUCTS COMPANY

8510 Warner Drive • Culver City, California • Dept. B-2

25c Postage Paid in U.S.A.

The Original MOORE'S Educational TOY MOTOR



Patent 1857209

For twenty-five cents you get all parts necessary to build this electric motor, which will make over 6,000 revolutions per minute. It runs on a single No. 6 dry cell battery. Over 3,000,000 Moore Toy Motors have been sold. As an aid to teaching electrical science it is unsurpassed and has been purchased by many schools.

GEORGE W. MOORE INC., 88 Beaver St., Waltham, Mass.

500,000 SURPLUS

•LENSES•

Send 3 cent stamp for "BARGAIN" list.

Hobbyist Lens Set—Magnifies, reducing lenses, positives, negatives, etc. 10 pc. lens set. . **$1.00**

A. JAEGERS, 123-26 B Rockaway Blvd., So. Ozone Park 20, N.Y.

MOHAWK CHIEF

REAL AIRCRAFT CYLINDER

Not Cast Iron or Aluminum Without Liner! 1-piece steel cylinder * Deep cylinder fins * 1-piece crankshaft * Alum. crankcase * 1-piece steel piston * Bakelite tank * Adjustable timer * Precision needle valve * Alum. conn. rod. * Champion spark plug * SPITFIRE COIL — $1.95

TRUE QUALITY **$8.95**

SPECIFICATIONS

.299 disp. B class. 2-10000 RPM. Wt., 7 oz. .760 bore. .660 stroke. If not available at dealer order direct, adding 25c for handling. Or send $1.00 and we will ship C.O.D. for balance. Mohawk Eng. Co., Mohawk, N.Y.

EVERY **BLOCK TESTED** ENGINE **GUARANTEED**

COMB-A-TRIM

The New Quick Trimmer

Something New! Trim your hair without any experience. It's easy! The excess hair comes off smoothly and easily by just pulling trimmer through hair like an ordinary comb. Save on hair-cut bills. . . . Trim your own hair or the whole family's. Send 59c and your Comb-A-Trim will be sent at once, postpaid.

59c

SPECIAL OFFER Send $1.00 for 2 Comb-A-Trims. Save 18c **2 for $1**

5 Extra Blades (Year's Supply) **25c**

COMB-A-TRIM CO., CAREW TOWER, Dept. J-24, Cincinnati, Ohio

GOV'T. SURPLUS PHOTO PAPER

OUTDATED BUT FULLY GUARANTEED

MONEY BACK GUARANTEE

Buy Now . . . Save Up To 75%!

4x5 Eastman Contact s.w. Glossy Grades 1-2-3 (Minimum order accepted on above paper three gross)	.47 gross
10x10 EK s.w. Glossy, contact, all grades	1.95 gross
10x20 EK s.w. Glossy, contact, all grades	2.50 gross
20x24 EK s.w. Glossy, contact, all grades	3.50 ½ gross
7"x125 Ft. EK Aero Bromide, Grade 1-2-3-4, per roll	2.50
9⅜"x200 Ft. EK Aero Bromide, Grade 1-2-3-4. per roll	2.95

SPECIAL: 9⅜" x 200 Ft. Velour Black, Semi-Mat (W) Projection, Water Resistant, Grade 3 — 3.95 roll

Send check, money order or cash . . . 25% deposit required on COD orders . . . all prices F.O.B. Culver City, Calif.

AIRBORNE SALES CO., INC., DEPT. PSM-2-8, CULVER CITY, CALIF.

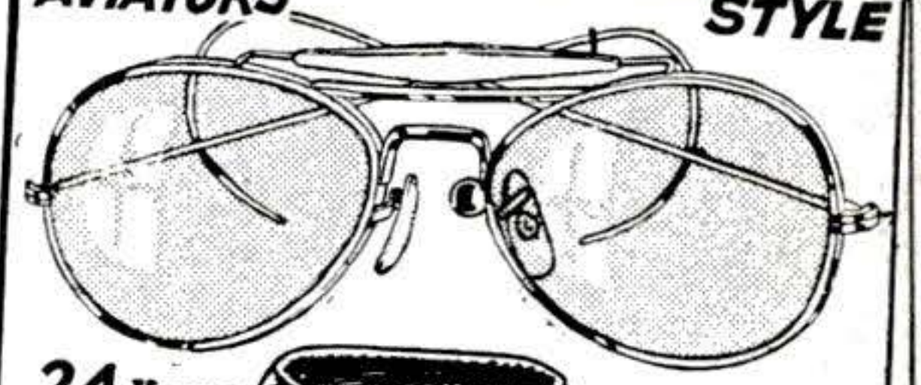
Copyrighted material

WAR! Surplus & other Startling BARGAINS!

Surplus DUST MASKS 33¢

BRAND NEW Here's a mask that will serve many purposes. Insecticide and paint spraying, Ideal for milling companies. Reg. $1.50 value.

AVIATORS STYLE



24 Karat GOLD RIM — 4 BASE CURVE

SUN GLASSES

BRAND NEW. The type the aviators used. Genuine 24-karat gold-plated rims, ophthalmic ground, 4-base curve. Eliminates 96% of ULTRA-VIOLET RAY. We sold thousands at twice the price.

2.88

BRAND NEW 17 JEWEL Military Style WATCH

24.95

PLUS 10% FED. TAX

The Greatest Watch Value in the U. S. A. Finest quality 17-jewel precision Swiss movement. DUST PROOF, WATER REPELLENT, SHOCK PROOF, ANTI-MAGNETIC, SWEEP SECOND HAND, Stainless Steel Case. Complete with strap.

Be sure to include the 10% federal tax.

Genuine NYLON PER HANK 59¢

PARACHUTE CORDS

3/16-in. diameter. Has a tensile strength of 550 lbs. Ideal for clotherlines, venetian blind and drapery cords. Each hank 50 ft. long.

Surplus NAVY UNLINED FIELD JACKETS

3.99

BRAND NEW. Made of fine quality water-repellent poplin material. Unlined, full zipper front, 2 slash pockets. Here's an ideal utility jacket for all-around wear. Worth twice our price.

O. D. WOOL Serge SHIRTS AND PANTS

These were designated for reissue. Used, Absolute Perfect Condition. All have been cleaned and pressed by the Q. M. Corp. 100% wool serge. Less than the price of the cheapest overall.

SHIRTS SIZES 13 TO 15	PANTS SIZES 28 TO 33
2.69	2.95

69¢ Navy STYLE "T" SHIRTS

BRAND NEW. Made of fine quality long staple cotton yarn. White only. Sizes: small, medium, and large.

U.S. NAVY WORK JACKETS

U. S. Navy Regulation
First Quality
Brand New
Full Cut Sizes

1.69

Made of 8-oz green herringbone twill. Tailored to Navy specifications. Ideal utility and work jacket.

FREE SURPLUS Circular

Send for

Write today for our FREE WAR SURPLUS CATALOGUE. Over 150 war surplus items, also other outstanding values.

ORDER BY MAIL

Please send remittance with order. ADD APPROXIMATE POSTAGE. If desired, merchandise will be shipped C. O. D. plus postage and C. O. D. charges.

SIOUX FALLS SURPLUS STORE

SIOUX FALLS, S. DAK.

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 39 years expert instruction—over 108.000 students enrolled. LL.B. Degree awarded. All texts furnished. Easy payments. G.I. Approved. Send for FREE BOOK.

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 86-S, 646 N. Michigan Ave., Chicago 11, Ill.

Say You Saw It In Popular Science

AIR FORCE FLIGHT BOOTS

A-6 type, will keep your feet warm and dry in the coldest weather. Genuine shearling fully lined. Rubber soles and zipper closure. Reconditioned like new. State shoe size when ordering.

$6.95

Free catalog of G.I. work clothing.

SURPLUS MERCHANDISE DEALERS, Dept. P. S.
1214 Broadway NEW YORK, N. Y.

Amazing Lens Invention Makes New Advertising Sign BRILLIANT AS NEON!

COSTS ONLY ½ AS MUCH

600

POWERFUL Magnifying Lenses to EVERY SQ. INCH!

Center of every letter is clear so light shines through. Translucent edges give "aura" effect of Neon.

Choice of Thousands of Different Glass Panels. CHANGE ADVERTISING MESSAGE IN 10 SECONDS!

AGENTS! Fast Sales In Every Kind of Retail Store. Big Profit on Every Sale!

A few years ago, men who got in on the "ground floor" with Neon, cleaned up **millions. Today,** a few wide-awake men are offered a chance to cash in on another advertising opportunity that may be even bigger—a "once-in-a-lifetime" chance to get in on the **"ground floor"** with the new Fluorescent MAXILUME Business Builder—the advertising Display Sign that can change **sales messages in 10 seconds! Here is an invention as startling, as revolutionary as Neon was 10 years ago.** For it offers all the advantages of Neon at **½ the original cost and at an operating cost of only 2c a day!**

FREE! Send Name for SAMPLE OFFER and FREE SELLING OUTFIT

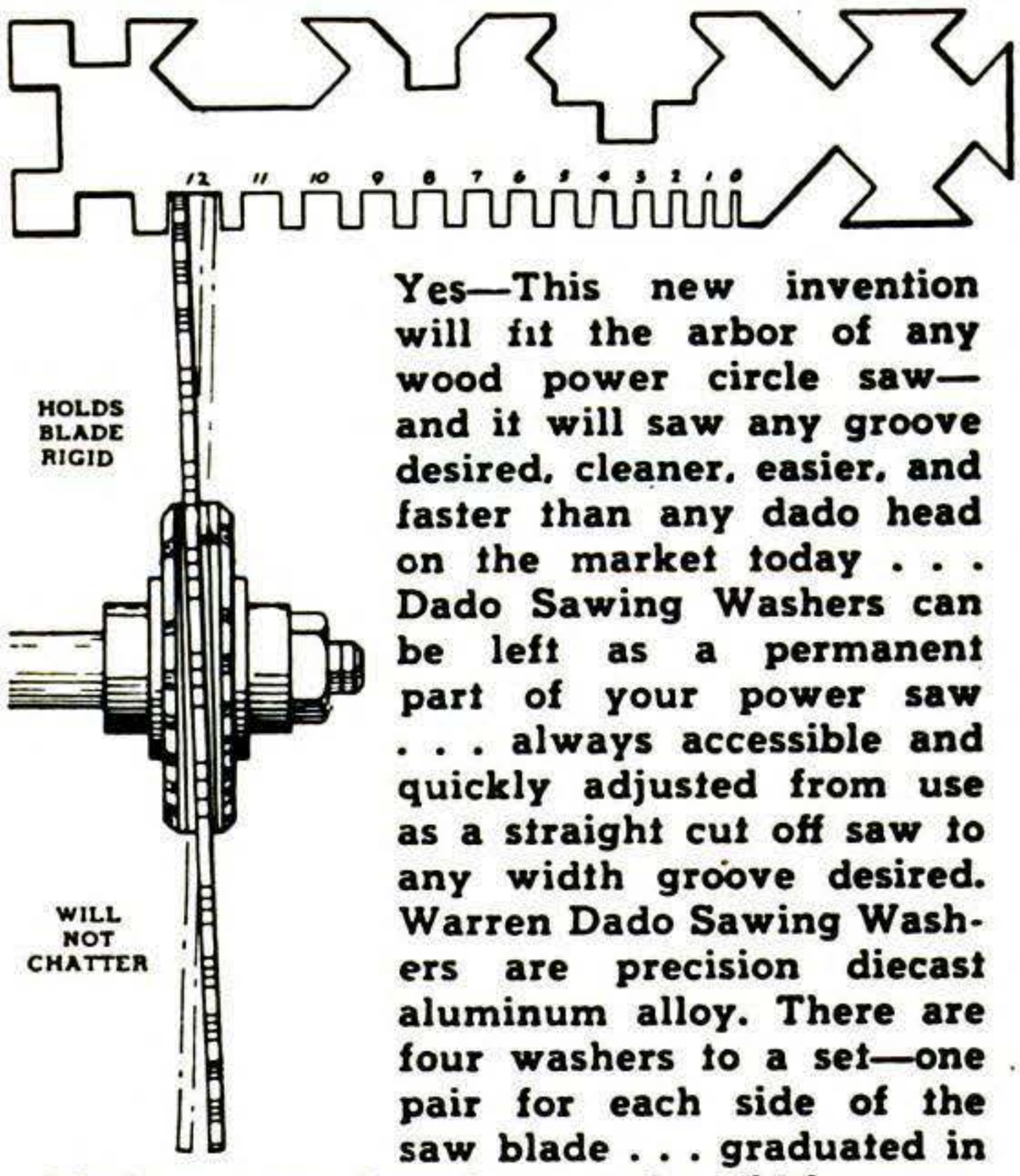
Every retail store, every large manufacturer, every advertiser in the United States is a prospect for one to 100 or more Business Builders. Space does not permit printing all facts. But if you want big, quick profits in volume you never dreamed of, you'll get the facts in a hurry! Don't send a penny. Just your name on a penny post card brings Free Selling Outfit. Do this quick—for the biggest cash clean-up in the history of Direct Selling!

MAXILUME COMPANY, 125 W. Hubbard, Dept. 92, Chicago 10, Illinois

Copyrighted material

Sensationally New!

YOUR CIRCLE SAW BLADE CAN CUT GROVES LIKE THIS
Easily — Quickly — Accurately

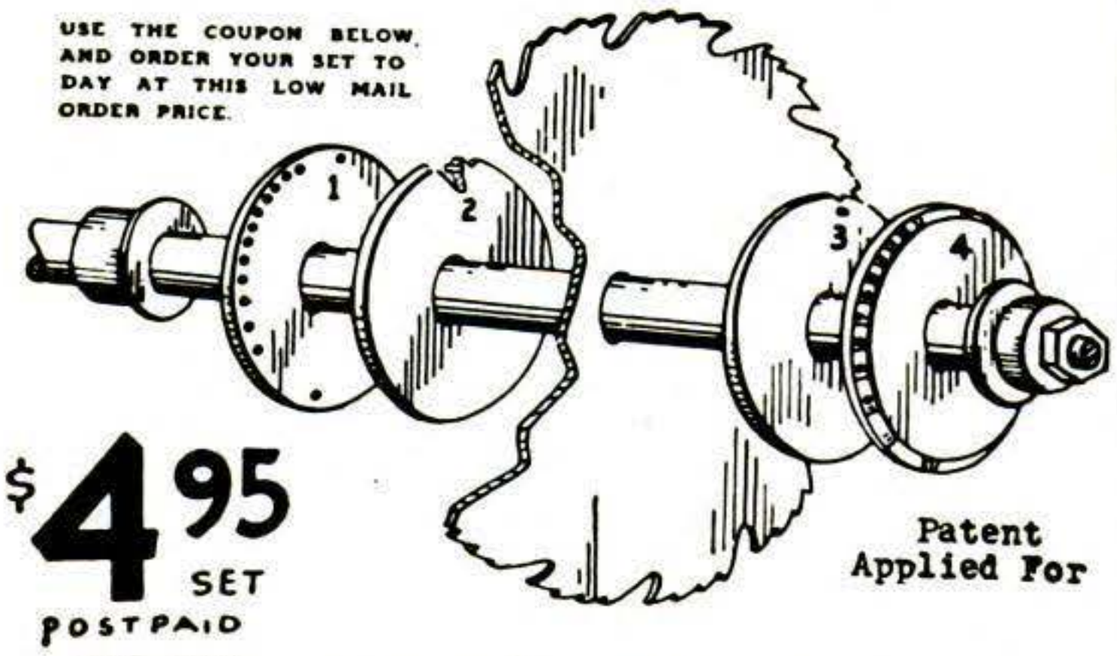


Yes—This new invention will fit the arbor of any wood power circle saw—and it will saw any groove desired, cleaner, easier, and faster than any dado head on the market today . . . Dado Sawing Washers can be left as a permanent part of your power saw . . . always accessible and quickly adjusted from use as a straight cut off saw to any width groove desired. Warren Dado Sawing Washers are precision diecast aluminum alloy. There are four washers to a set—one pair for each side of the saw blade . . . graduated in 32nds and numbered to cut the width groove desired.

Each number on the Warren Dado Sawing Washers equals the width of its cut with your saw blade. If an unusually wide groove is desired two cuts may be taken.

On a standard size saw arbor using a ten inch saw blade with correct size arbor hole the maximum side movement without injuring saw or machine bearings is ⅝ inch.

USE THE COUPON BELOW AND ORDER YOUR SET TO DAY AT THIS LOW MAIL ORDER PRICE.



$4.95 SET POSTPAID INC. TAX

Patent Applied For

Arbor Size ☐ ½ ☐ ⅝ ☐ ¾ Circular Only ☐

Enclosed is... ☐ Money Order ☐ Check

WARREN DADO SAWING WASHERS CO.
P. O. BOX 98, DEPT. P S 2 NORTH END STATION
DETROIT, MICHIGAN

STOP CHANGING MOTOR OIL!

End this needless waste and expense forever with . . . RECLAIMO

Today's Most Advanced Oil Re-Refining Filter!

Continuously cleans and **RE-REFINES** motor oil as you drive (by utilizing motor heat)—keeps oil in high grade lubricating quality at all times—reduces motor wear to an absolute minimum! Proves conclusively that **"Oil Does Not Wear Out Mechanically"** as stated in **U. S. Bureau of Standards. (Bulletin 86.)**

"RECLAIMO"

REMOVES SOLIDS (by filtration)
REMOVES WATER (by distillation)
PREVENTS Excess Fuel Dilution
PREVENTS Acid & Sludge Formation

MAINTAINS Stable Viscosity **ELIMINATES** All Oil Changes!

CAR—TRUCK—TRACTOR OWNERS!

You'll want to know more about Reclaimo's Oil, Motor and Money Saving Features. **FREE 40-PAGE BOOK "OIL FACTS"** gives you the complete "Reclaimo" story plus details about our **NEW 90-DAY NO RISK—NO COST TRIAL OFFER! Write for your copy today!**

RECLAIMO MFG. CO.
5083 Elston Ave., Dept. 63, Chicago 30, Ill.

MODELMAKERS

JEWELERS . . . INSTRUMENT MFTRS.

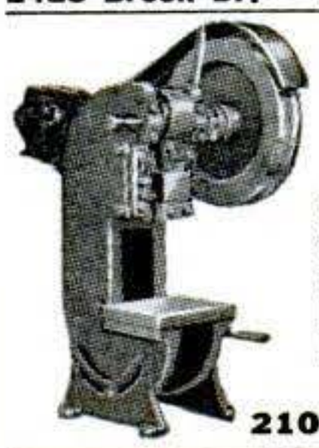
ARBOR PRESS

The "K" Press is recommended for light high-speed production and assembly presswork. Provides fine sensitive control for pressing small shafts, gears, wheels and bushings. Frame, table and standard are grey iron well braced and accurately machined. Ram take-up provided. Table and standard removable for large work. Finish machine gray. Height 7½"; over table 2½"; over base 4¾"; ram 5/16" x 7/16"; ram travel 2¼"; approx. pressure 250 lb. See your dealer or order direct $9.00 plus postage, wt. 7 lbs. Prompt delivery. (Straightening attachment 4½" between v-supports $3.60 plus postage, wt. 2 lbs.)

H. D. HERDER, *Tool Specialties*
2428 Brook Dr. KALAMAZOO 82, MICH.

5 TON

PUNCH PRESS



Bench Model, Open Back, Inclinable **$167.50** Deliv. from Stock. Start your own profitable business making Toys, Novelties, Models, Send for free literature.

JOHN E. KANDLER CO.
210 N. Rose Street Kalamazoo 12, Mich.

ELECTRICITY *Anywhere*

for HOMES FARMS SHOPS BOATS RADIO USE

● Onan gasoline-engine-driven Electric Plants supply reliable, economical electric service for any use Portable, stationary or stand-by models. Water or air-cooled, compact and rugged.

A.C.: 350 to 35,000 watts in all standard voltages and frequencies. D.C.: 600 to 10,000 watts, 115 and 230 volts. BATTERY CHARGERS: 500 to 3,500 watts; 6, 12, 24, 32 volts.

Write for folder

D. W. ONAN & SONS INC.
2780 Royalston Ave., Minneapolis 5, Minn.

Onan PRODUCTS

Copyrighted material

Every MILE SAVES YOU MONEY!

"PAY AS YOU RIDE"

Cushman MOTOR SCOOTER

75 MILES PER GALLON

Cushman Sport Model, 52-A

Enjoy America's new ride—and save money every mile! The Cushman Motor Scooter travels 300 miles on a dollar's worth of gas. Operates for less than 1c per mile. Will carry 2 passengers. Has rugged 4 H. P. Cushman "Husky" engine, two-speed transmission, automatic clutch, balloon tires and knee-action springing for added comfort. Park anywhere. Gives you a "second car" at low cost.

Cushman Engines

For 47 years Cushman has produced high quality small air-cooled and water-cooled engines. These engines are available to original equipment manufacturers and other users. Write for details.

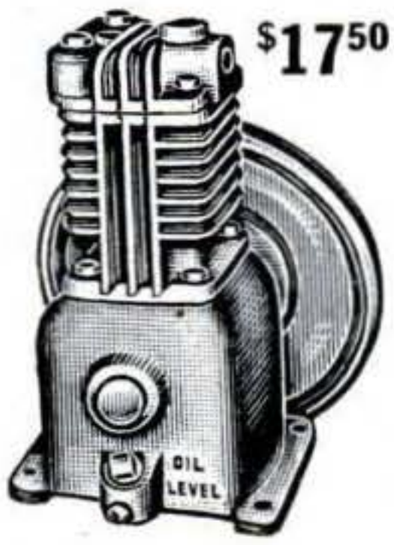
FREE Write for Free Folders, name of your nearest dealer and details of new **TIME PAYMENT PLAN**

CUSHMAN MOTOR WORKS, INC., Dept. S-200 Lincoln, Nebr.

5 GREAT MODELS TO CHOOSE FROM

AIR COMPRESSOR

AT A BARGAIN



$17.50

Piston type, size 2 x 1¾, head in valves, bronze bearings, splash lubrication. "V" Belt drive. Intake muffler and cleaner. Capacity 2.8 c.f.m. at 100 lbs. continuous pressure or 150 lbs. Intermittent, with ½ HP motor. Can be used with ¼ HP or ⅓ HP at lower speed. Weight 24 lbs. Send check or money order. Sold on money back guarantee.

Immediate delivery.

Price only $17.50 F.O.B. Chicago

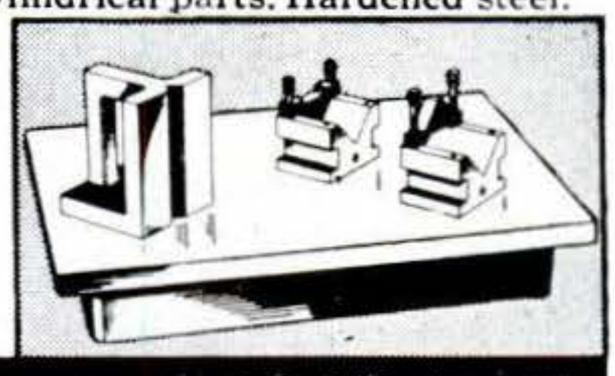
C & M EQUIPMENT COMPANY 1831 S. State St. Dept. B-2, Chicago 16, Ill.

SOUTH BEND NEW Surface Plate V-Blocks, Angle Plate

SURFACE PLATE for laying out, surfacing, checking flat surfaces, etc. Precision ground top. 12" x 17" x 3", top 3/4" thick. **Price . . $37.50**

V-BLOCKS for holding cylindrical parts. Hardened steel. All surfaces precision ground. Size 1-15/16" x 2-15/16" x 2-1/4". Capacity 1/4" to 2". **Price per matched pair . . $32.00**

ANGLE PLATE. Precision ground on six sides. 3-1/4" x 3-1/4" x 4-1/4" with 5/8" V-groove. **Price . $20.00**



SOUTH BEND LATHE WORKS 456 E. Madison St. South Bend 22, Ind.

WAR SURPLUS

STANLEY SUPER-VAC

MADE FOR U. S. NAVY

America's finest Lifetime Vacuum Bottle. Sold everywhere before the war at $7.95. Not yet generally available at stores. We have BRAND NEW NAVY SURPLUS 1 QT. SIZE. Unbreakable steel liner. Handsome black finish. Heavy chromium plated screw top. Perfect for sportsmen, workers, hunters, fishermen, etc. An outstanding value. Don't miss it.

QT. SIZE $5.95 Plus 25c postage & handling

Sensational!

U. S. Infantry & Armed Forces SOUND POWERED PHONES

- NO ELECTRICITY
- NO BATTERIES
- 2 WAY OPERATION
- PERFECT TO 1 MILE

Here is the battle proven U.S. Infantry SOUND POWERED PHONES. Ideal for communication from house to garage, to barn, to workshop, to field. Just hook up to any two strand wire. No electricity or batteries needed. 2 magnetic type receivers for hearing and speaking. Adjustable headband. Perfectly safe. Even children can operate it. A remarkable value.

WEATHERPROOF 2 STRAND WIRE 2 CENTS PER FOOT Plus 35c postage per 100 Ft.

$2.95 Complete plus 25c postage & handling

PRISMATIC TYPE! ALL METAL! PRECISION MADE

Liko BINOCULAR

WITH COATED OPTICS

Insures increased visibility and elimination of glare "Ghost" images and distortion.

The perfect Binocular for sportsmen, hunters, yachtsmen, racing fans, tourists, vacationist, theatre goers, nature lovers, etc.

$8.95 Plus 20% Fed. Tax. Also add 25c postage.

INCLUDED: Leatherette Carrying Case and Shoulder Straps

LOOK AT THESE FEATURES!

- Inter-Pupillary adjustment
- 45 mm. Precision Ground and Polished objective lenses
- Cushioned Shock Absorbing Lens Mounts
- All Metal Construction
- Combination Leatherette Trim and Double Coated Baked Crinkle Body Finish
- Matched Negative Eye Piece Gallilean Magnifier Type Lenses
- One Hand Finger Tip Focusing
- Lenses matched for Maximum Power and Clearness
- 3½ Power...Lightweight
- Dust Proof Lens Mounts

17 JEWEL WRIST WATCH

SERVICE PRECISION WATCH

SWISS MOVEMENT-INCABLOC

- WATERPROOF
- SHOCKPROOF
- SWEEP SECOND HAND
- RADIUM DIAL
- STAINLESS STEEL BACK
- LEATHER STRAP

Brand New . . . Complete satisfaction guaranteed or money refunded.

A GREAT VALUE

$19.95 A regular $50.00 value

Add 10% Fed. Tax plus 25c postage & insurance

FREE Send for free illustrated catalogue. Has many marvelous War Surplus Bargains.

ALLIED SALES CO.

DEPT. SF • 88 CLAY STREET • SAN FRANCISCO 11, CALIFORNIA

Send check or money order. Sorry no C.O.D.s.

Copyrighted material

HAND GRINDER STONES

152 PIECE ASSORTMENT

MOUNTED STONES, FILES, BURRS, BUFFERS, etc.

ALL BRAND NEW

An amazing value for home and shop. Actually 152 pieces; mounted stones, abrasives, polishing and finishing parts, files, burrs, etc. You'll find hundreds of uses for this great array of wanted parts. Assortment includes the following:

8 Mtd. grinding stones on 1/8" shank
2 Fast cutting grinding wheels 3/4 x 1/8"
1 Circular Saw 3/4 x 023 x 1/8 in.
2 1" sewed muslin buffs
6 7/8" cut-off wheels
4 Cutters, ass't. shapes 1/8" shank
1 3/4 x 3/32 mtd. wire brush
3 Ass't. felt wheels
1 Drum sander on 3/32" shank
2 3/4 x 1/8 x 1/16 in. rubber wheels
3 Ass't. bristle brushes, mounted
3 Cutters 3/32" shank
4 Mtd. wheels on 3/32" shank
100 Emery discs, 7/8" med. grit
5 1/8 x 1/16 in. mandrels
1 Roughing stone
6 Drum sleeves
1 Felt cone

This great assortment will give you years of service. Regular retail value over $20.00. Now postpaid in U.S.A. only..... **$8.95**

41 PIECE STONE ASSORTMENT

A great value for home and shop. All parts are brand new—packed in an attractive set-up box as illustrated. You'd pay well over $15.00 if you bought these parts separately. Sent postpaid in U. S. A. Satisfaction guaranteed. Assortment consists of the following pieces—41 pieces in all.

20 Mounted Stones. Assorted shapes and grits, all on 1/8 inch shanks.
10 Mounted Stones. Assorted shapes, all on 3/32 inch shanks.
10 1x1/8x1/8 inch grinding wheels. Top quality and all brand new.
1 1/4x1/8 inch Mandrel.

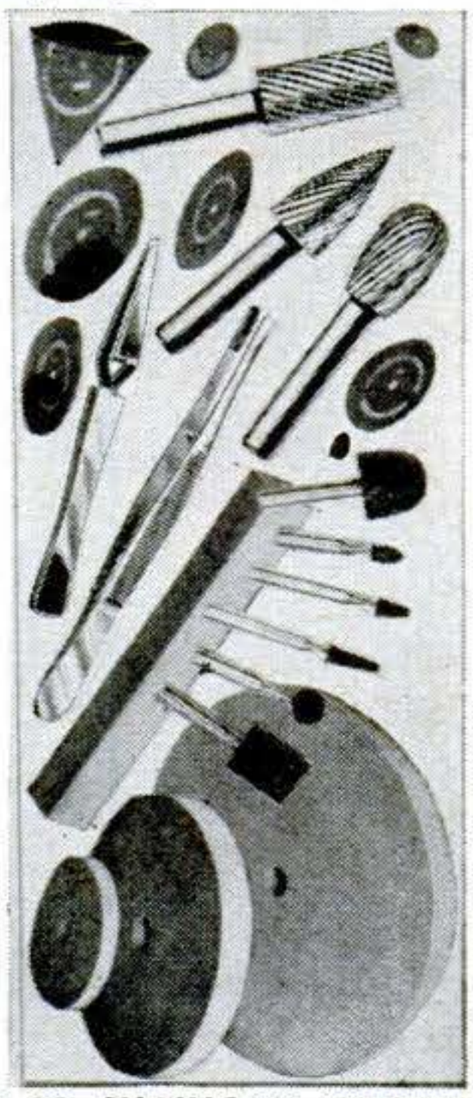
$4.95

THE WHOLE ASSORTMENT—POSTPAID, ONLY

ACTUALLY $50.00 WORTH OF

GRINDING WHEELS

Abrasive discs, felt and buffing wheels, mandrels, rotary files, sheets, etc.



The buy of a lifetime! 327 pieces including 35 ass't. Grinding and Cut-off wheels up to 10 inches diameter, 1/16 to 1 1/4 in. face, 1/8 to 3 in. holes. Assorted grits—all brand new—made by Norton, Carborundum, Macklin, Bay State, etc. Also included are 100 slotted disc cloths; 100 paper discs; 3 round wire brushes on handles; 2 felt bobs; 2 felt wheels; 1 4" rag buff; 3 honing stones; 10 abrasive sleeves; 10 mounted stones, 1/8 and 1/4 shank; 2 mandrels; 2 rotary files, 1/4 shank; 50 abrasive discs; 2 72" abrasive belts; 5 9x11 abrasive sheets. Satisfaction guaranteed. Order today.

327 PIECES ASS'T. SIZES FOB CHICAGO **$6.95**

ALL FOR ONLY

GROBAN SUPPLY CO. 1522 SO. MICHIGAN AVENUE DEPT. PS-2, CHICAGO 5, ILL.

Foredom PRESTO-FLEX

NOW! For Only $5.95 You can have an Amazing New FLEXIBLE SHAFT TOOL

with PENCIL-SIZE HANDPIECE

Grinds, Polishes, Sharpens, Cleans, Mills, Carves Engraves, Etches on Metal, Wood, Glass and Plastic

Now you can turn your old motor, drill press, or electric drill into a Flexible Shaft Tool. Amazing new Presto-flex, latest addition to the Foredom flexible shaft family. Simply attach to your electric drill, drill press or motor. **Presto**—a flexible shaft machine! Off again in a jiffy! Pencil size handpiece gives you finger-tip control. Gets into tight places you can't reach with any other tool. Handy 35" overall length. And—only $5.95 complete! Order NOW.

SEND NO MONEY

Just send your name and address. We will rush your **Presto-flex** COD. Pay postman $5.95 plus postage or send $5.95 now and WE pay postage. Money back if not **delighted!** If you order **Presto-flex** for use on motor, specify motor shaft diameter and add 50c for motor coupling. (Available for 1/4", 5/16", 3/8" and 1/2" shafts.) 50 piece accessory set available $1.50 extra. Order TODAY from

FOREDOM ELECTRIC CO., Dept. 103
27 PARK PLACE • NEW YORK 7, N. Y.

DELCO MOTORS

1/75 H.P. Delco Motor—For cooling, ventilating and heating purposes. All are factory tested and guaranteed. Quiet operation. Triple rubber mountings. Horseshoe stand. 110 V.A.C., 60 Cy., 1000 C.F.M. 6 blade fan 7 1/2"—stand 6 1/4", 4 1/2" wide. Complete as shown. Shp. Wt. 5 lbs.

No. 7014 Suction Type
No. 9272 Blower Type....EACH $5.25

Lots of 10.....Each $4.90 Lots of 50.....Each $4.75
Plus Postage

FREE CATALOG—Send for new G. & E. Appliance & Parts Catalog

G. & E. EQUIPMENT SUPPLY CO.
Dept. P.S.2, Ogden Ave. at Fulton, Chicago 7, Illinois

Say You Saw It In Popular Science

MAN-SIZED

PARK WOOD-WORKER

HEAVY-DUTY MACHINE THAT DOES A MAN-SIZED JOB . . .

4 MACHINES IN 1

- SAW
- MULTI-SANDER
- SHAPER
- JOINTER

$89.95 Limited Offer

Carpenters! Hobbyists! Save time and money with Park Wood-Worker, a precision-built machine constructed to professional specifications. Four individual machines in one that bring down costs 50%. Park Wood-Worker has been specially designed for maximum strength and lasting efficiency . . . 10" saw cuts 3 1/2 x 3 1/2's—table-top size 15" x 21". Comes with durable stand. All parts fit easily and quickly. Get the facts—write for free, illustrated folder **now!**

PARK AVENUE TOOL MFG. CO.
1938 Park Avenue New York 35, N. Y.

FIREWORKS

CHINESE FIRE CRACKERS

1 Bundle or 1280—1 1/2" Crackers..... $4.50
1 Bundle or 1600—1 1/2" Crackers..... 5.35

BALLOONS—LATEX RUBBER

No. K 10, per gross..... $1.50
No. K 20, per gross..... 3.00

Write Dept. R for Wholesale Quotations.
Send Remittance with Order.

UNITED FIREWORKS MFG. CO., INC.
Dayton 7, Ohio

Copyrighted material

MAKE $ MORE
MONEY

Applying or Selling

CORKSTONE

A General Purpose Magnesium Oxychloride Flooring

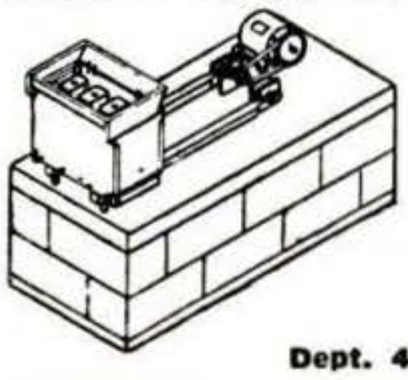
THE MODERN PLASTIC FLOORING

EASY TO APPLY
Here's your opportunity to get into business for yourself applying or selling Corkstone, the economical, top-grade plastic flooring. Plenty of profit. Act without delay!

Dealers & Agents Wanted
WRITE FOR DETAILS

LASTING PRODUCTS COMPANY
200 Block S. Franklintown Rd., Baltimore 23, Md.

BUILD THIS CONCRETE BLOCK MACHINE



Sell blocks; or build your home, garage, barn, or filling station at 1/3 cost by making and laying your own blocks.

This simple machine which you can build yourself at a cost of $15 (excluding motor) will make a block in 30 seconds using only one form. Mass production can be achieved by a new simple method of removing blocks which allows two to four forms to one vibrator. Power driven concrete mixer plans also. Send dime for details and "How to Make and Lay Blocks" folder.

U-BUILD-IT SERVICE
Dept. 4-A, 206 West Wilder St., Tampa 3, Florida

AGENTS
300% Profit

SIGN LETTERS

For Store Fronts and Office Windows. Anyone can put them on. Free Samples. Liberal Offer to general agents.
METALLIC LETTER CO., 441 N. Clark, Chicago 10

HOLD-E-ZEE

AUTOMATIC GRIP SCREWDRIVERS

MORE WORK IN LESS TIME!

UPSON BROS., INC.,
86 Exchange St., Rochester 4, N.Y.

Hold-E-Zees do the job better, faster. They excel wherever screwdrivers are used. Gripper instantly released by spring action, sliding up out of way when not in use. All materials highest quality.

AT LEADING DEALERS EVERYWHERE

Speed Sweep

THE BRUSH WITH THE STEEL BACK

MD

Sweeps cleaner, faster — Out lasts ordinary brushes 3 to 1!

Mail Coupon Today

Milwaukee Dustless Brush Co.
530 N. 22nd St., Milwaukee 3, Wis.

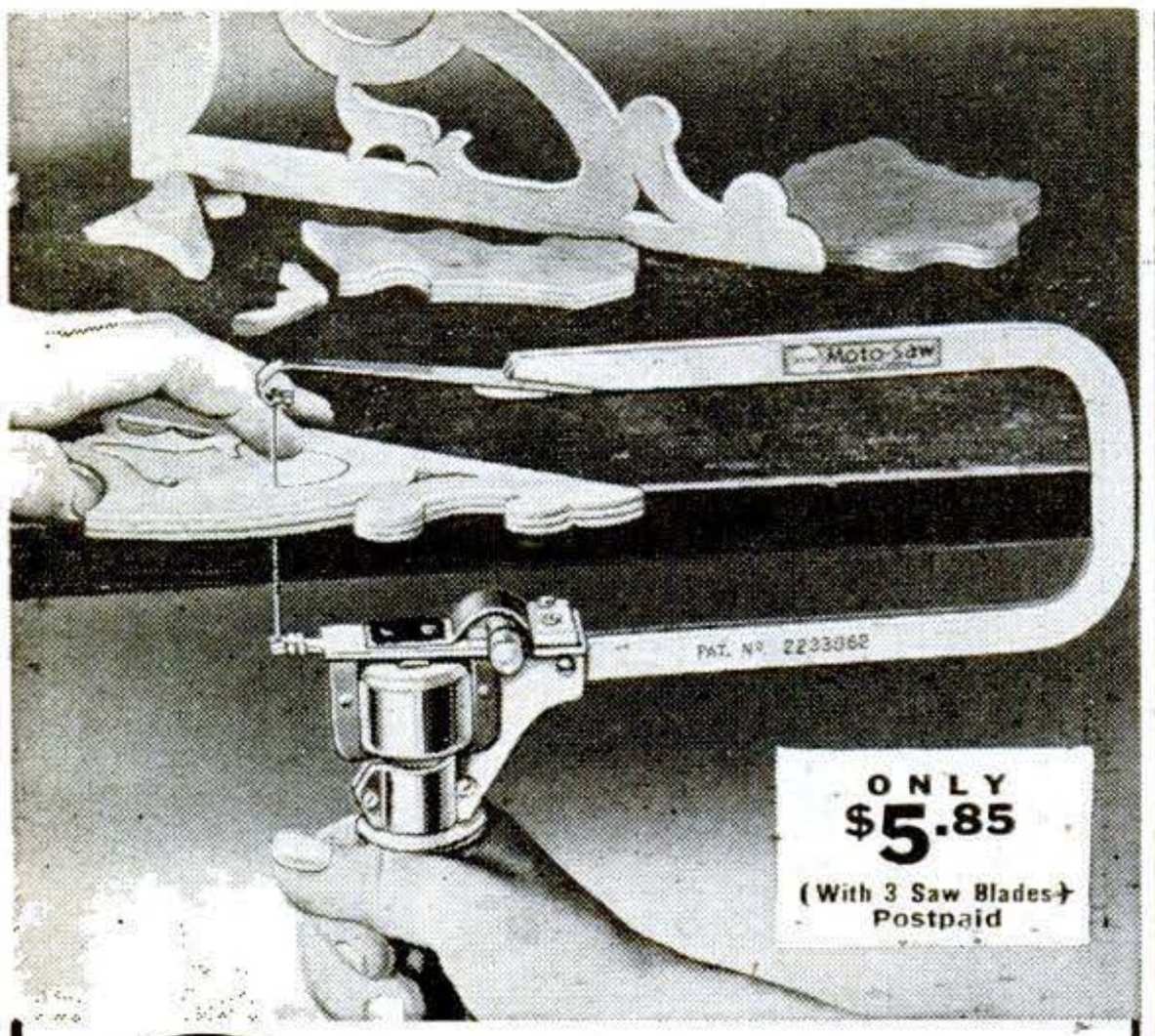
Please send me complete information about Speed Sweep brushes.

Name _____

Street Address _____

City, State _____

Copyrighted material



ELECTRIC DREMEL POWER TOOLS

MOTO-SAW

THE AMAZING ELECTRIC SCROLL SAW

Boys from 8 to 80 (and girls, too) have fun with a Moto-Saw . . . it works more like magic than any tool you ever saw! It takes no effort to run, no perceptible pressure to feed. Runs 7,200 strokes a minute . . . easily cuts intricate scroll designs in medium hard wood up to ¾" thick. Blade holder faces blade 4 ways . . . permits you to saw sideways as well as forward and backward. No limit to length of stock it will cut . . . saws to center of 19" widths. **Moto-Saw is as safe as a hand saw** . . . has only two moving parts . . . never needs oiling. Uses 110-120 V. 50 or 60 cycle A.C. (only). Thousands of satisfied users.

MONEY-BACK GUARANTEE: If your dealer does not yet have Moto-Saw, send only **$5.85** . . . we'll pay postage. Or send $1, and pay postman balance plus postage. Money back if not delighted after 5 days' trial.

DREMEL MFG. CO., DEPT. S128-B, RACINE, WIS.

KAYAKS

AQUA V 18

Easy to Build

OUTBOARDS ROWBOATS

25¢ COIN FOR ALL THREE

BOATS for *Home Assembly*

KAYAKS, ROWBOATS, DINGHIES, INBOARDS, OUTBOARDS, RUNABOUTS

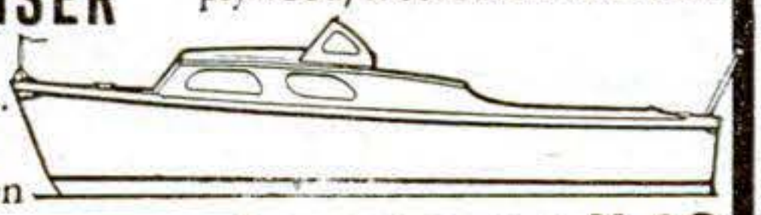
Cut-To-Fit for Quick Assembly. Everything Complete plus Illustrated Instructions. No Experience Necessary. Simple as A. B. C.

SEND 25¢ POSTAGE (COIN) TODAY FOR 3 MONEY SAVING ILLUS. CATALOGS

Showing all '48 Models (marine plywood) & construction details.

V-23 CRUISER

Length 23 Ft.
Beam 7 Ft., 10 In.
Draft 14½ In.
Sleeps Two. Open or With Cabin.



AQUAMOBILE V-18

Designed for Auto Engines. Open or with cab. Length 18 ft. Fast VEE Bottom Hull.

KAYAK BOAT CO., 703R-WHITTIER ST., NEW YORK 59, N. Y.

BE YOUR OWN BOSS!

LEARN ELECTROPLATING

HIGHLY PAID FIELD

UNCROWDED, interesting business. Part or full time. Common school education sufficient. Chromium, Nickel, Silver, Gold, etc., money making trade secrets. Learn at home in spare time. *Send postcard today for* ***FREE*** *electroplating idea booklet.*

PLATER HYDE

432 F Street Room 522
San Diego 1, California

WOODWORKERS . . . *Get this*

CONSTANTINE MASTER MANUAL

Get the Most Fun From Your Hobby

Indispensable to woodworkers. Newest, biggest edition, more pages, more color, helpful how-to-do-it articles, pre-war and new items, more bargains. Send 25c today and we will include ***FREE! FULL YRS. SUBSCRIPTION*** to Chips and Chats, published bi-monthly. Keeps you up-to-date on everything in woodworking, offers big money-saving bargains. Send now.

ALBERT CONSTANTINE & SON. Inc.
793-P 135th Street, New York 54, N. Y.

Ottawa Self-Propelled Buzz Master

CLEARS LAND FAST! Powerful 7-HP motor with friction clutch for safe operation. Cuts down timber, brush and hedge; turn blade vertically and saw logs to length. **Also furnished with post hole diggers.** Has clutch pulley for belt work.

No Other Like It!

OTTAWA MFG. CO., 1-801 Brush Ave., Ottawa, Kansas

FREE! FAMOUS BLUE BOOK CATALOG

GAME SUPPLIES

Club Furniture - Counter Games - Punchboards - Magic Cards Readers. Read the backs - Inks - Daubs - Poker Chips - Tops Flats - Layouts - Game Boxes.

K.C. CARD CO., 838 South Wabash Ave., Chicago 5, Ill.

AUXILIARY POWER PLANTS

Govt cost $300. our Price $40.
Description available. No C.O.D.

NEW YORK OUTLET & SALES CORP. 144 Chambers St. N.Y. 7, N.Y.

If Ruptured

Do What Others Now Do—

Wear a Form Fitting MILLER Truss

which provides natural freedom and comfort in working, walking, playing, horse back riding, dancing, swimming or sleeping. You just cannot afford to be without this protection and convenience.

Wear two weeks then consult your physician before deciding to keep it.

Write me today for **FREE** descriptive circular. Sent in plain, sealed envelope.

FRED B. MILLER Manufacturer
Dept. P.S. Hagerstown, Maryland.

Copyrighted material

Now! Set of 7 STRIPE SIZES at a BARGAIN PRICE

PAINTERS' STRIPING TOOL

Now you can paint 7 stripe widths on furniture, bikes, model planes, bulletins, wall board . . . make plain walls look like tile! Easier than using a pencil! Straight, curved, circular, even parallel stripes made expertly in any color! Regular price Type "M" Tool with tip for 1/16" stripe $1.00. Extra tips 1/64", 1/32", 3/64", 1/16", 5/64", 3/32", 1/8" –75c each. Special offer: Tool with complete set of 7 tips $5.00. (C.O.D. orders 25c extra.) WENDELL MFG. CO., 4234-A Lincoln Ave., Chicago 18, Ill.

A TOOL . . . NOT A BRUSH

Dealers Write Today!

ONE-MAN SAWMILL LESS THAN $200.00

Easy To Turn Trees Into Money

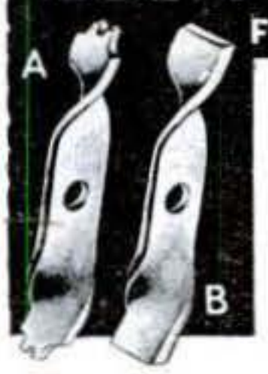
Makes Lumber ties, shingles, crates, lath, studding.

BELSAW MODELS in 10 to 24 foot sawing lengths. MECHANICAL FEED, accurate set works and positive dogs. Use tractor or old auto engine for low cost power. Thousands used for commercial sawing. Pays for itself quickly. Send post card today for FREE booklet, "How To Make Lumber" and Catalog of Woodworking Equipment.

BELSAW MACHINERY COMPANY
2846-J Field Bldg., 315 Westport Rd., Kansas City 2, Mo.

USE YOUR BENCH SAW

FOR JOINTING & CUTTING MOULDINGS



With our six inch tool steel cutters make mouldings, casings, drop-leaf tables, grooves beading and jointing. Moulding cutters, A 1 in. wide $1.50. 1½ in. $2.00. Jointing cutters. B 1 in. $1.50. 1½ in. $2.00. E 1 in. for drop-leaf tables. $1.50. E 1½ in. Makes ¾ in. cove & Quarter. $2.00. Postpaid. Guaranteed. State size hole. List & Folder free.

JOHN A. SANDSTROM
Rt. 1-P. Clearwater, Fla.

New MIRACLE WALL CLEANER

Saves Costly Redecorating!

AMAZING INVENTION. Banishes old-style housecleaning mess and muss. No rags—no sticky "dough"—no red, swollen hands. No more dangerous stepladders. Literally erases dirt like magic from walls, ceilings, window shades, upholstered furniture, etc. *Endsdrudnery!* SAVES REDECORATING!

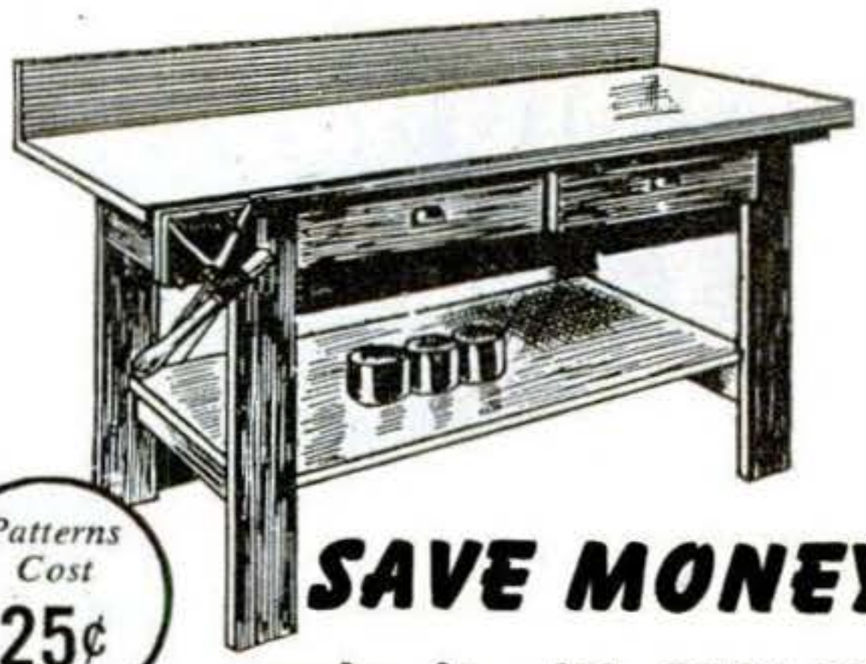
SAMPLES FOR AGENTS Sample offer sent immediately to all who send name at once. A penny postal will do. SEND NO MONEY—just your name. KRISTEE CO., 698 Bar Street, AKRON, OHIO.

WHEELS AT BARGAIN PRICES

...4" wheel & tire, 5/16" sleeve bearing & hub cap ..... $0.45 ea.
...5" wheel ⅝" solid tire 5/16" shaft hole.... 0.65 ea.
...6" wheel ⅝" solid tire 5/16" shaft hole.... 0.75 ea.
...7" wheel ¾" solid tire ⅜" shaft hole..... 0.85 ea.
...8" wheel 1" solid tire ½" sleeve bearing.. 1.25 ea.
...8 x 2" wheel, semi-pneumatic tire 7/16" ball bearing..... 2.50 ea.
...10 x 1.75 wheel semi-pneumatic tire 7/16" ball bearing..... 3.25 ea.
...12 x 1.75 wheel semi-pneumatic tire 7/16" ball bearing..... 3.50 ea.
...10 x 2.50 wheel semi-pneumatic ½" ball bearing..... 4.50 ea.
...6 x 2" wheel ⅝" ball bearing, solid tires.. 3.95 ea.

BUILD YOUR OWN Wagons, Scooters, Soap Box Racers, Welding Carts, Baby Pens, etc.

To order above wheels write number wheels wanted in space provided, tear out and mail this ad with check or money order and your name and address. If other sizes are wanted write for FREE LIST.
TRULSON MFG. CO., 811 E. 31 St., Dept. S12, Kansas City, Mo.



Patterns Cost 25¢

SAVE MONEY— make it with EASI-BILD* Full-Size Patterns!

Save at least ½ cost of this quality workbench. Trace the full-size pattern on wood: saw, assemble.

Use *CASCOPHEN Resin Glue*, recommended by Easi-Bild, for durable, waterproof, moldproof bonds, even in damp basements.

Over 100 patterns for furniture, toys, gifts, buildings, and home needs: Get workbench plans at nearest hardware store or send coupon below and 25¢ to:

CASCO Pattern Dep't. PS-28, P.O. Box 215, Pleasantville, N.Y.

Please send me plans for Workbench, Project No. 15.

Name_____

Address_____

City_____ Zone____ State_____

Choose the right glue for the job!

Boats, Outdoor Furniture, Sports Equipment—joints that must withstand outdoor exposure—CASCOPHEN (Resorcin Resin Glue). The first completely durable glue available to homecraftsmen.

For Furniture, Toys, Heavy-duty Home Repairs—strong, stainfree, moldproof, highly water-resistant CASCAMITE (Urea Resin Glue). Mixes quickly with cold water!

For Models, Photo Prints, Labeling—general home, school, or office gluing, use the new, clean, white, fast-setting CASCOREZ (Polyvinyl Resin Glue). Liquid, ready to use!

FOR FREE GLUING CHART WRITE:

Casein Company of America, Dept. PS-28, 350 Madison Ave., New York 17, N.Y.

Please send me *free* Gluing Chart which gives full details in choosing the right glue for this job.

Name_____

Address_____

City_____ Zone____ State_____

CASEIN COMPANY OF AMERICA

Makers of Casco Glues • *©1948, Easi-Bild Pattern Co.

Copyrighted material

BIG MONEY IN TELEVISION

BUILD TELEVISION SETS for PLEASURE and PROFIT!

Learn television by **building your own television set** with the famous **TRANSVISION Television Kit.** Big future in this growing field.

TRANSVISION KITS save you upward of 50%. **Large 12" tube Kit costs you only $289.50;** gives larger image, better sight and sound reception than many sets selling at $500.00. **Each Kit is COMPLETE** with all tubes, pre-tuned R.F. Unit, antenna, wire, solder, and instructions.

EASY TO ASSEMBLE. No technical knowledge required. Clear step-by-step instruction manual guides you to successful assembly in 24 hours. **TRANSVISION** "Service Notes" gives you priceless education in television.

FLASH! Brand new 15" tube Kits now available. Also 7", 10" and 12" tube Kits. **Tremendous savings.** All Kits backed by factory guarantee. Write today for further details to **Dept. P.S.**

SEND FOR FREE CATALOG

BEACON TELEVISION, INC.
785 THIRD AVENUE NEW YORK 17, N. Y.

FOREDOM FLEXIBLE SHAFT MACHINE

only $19.95

with PENCIL SIZE HANDPIECE

for Finger-Tip Control

Works effortlessly and with marvelous ease. Tens of thousands of users attest to its infinite superiority over other small grinders. Affords you vastly more satisfaction and fun.

5 REASONS WHY FOREDOMS ARE TOPS IN THE FIELD:

1. Extra power and longer motor life because motor not dwarfed to fit hand. 2. Correct handpiece size for deft, sensitive, finger-tip control. 3. No obstructed view of your work. 4. Freedom from gyroscopic action —hence better work. 5. Small handpiece size lets you get into hard-to-reach places.

HUNDREDS OF USES

Foredoms handle hundreds of tasks. Use them for pleasure or profit, for tinkering or expert craftsmanship. Their versatility is unlimited. Use them to grind, polish, mill, engrave, sharpen, slot, rout, saw, carve, clean, sand, etch, cut, etc. Ideal for internal carving of plastics, the astounding new craft. You can work on wood, glass, plastics and all metals with a Foredom.

OVER 60,000 FOREDOMS NOW IN USE

The power grinder you'll eventually buy if you want true operating ease and results which genuinely satisfy. Foredom's quarter century experience in building fine tools for home and industry is your assurance of superior performance.

Order your Foredom today, direct on 10-day trial. Send check or M.O. for $19.95 (price not increased since OPA) and we send postpaid in U. S. or send $2.00 and you pay postman balance plus postage. 50-piece accessory set $1.50 extra. Catalog on request.

FOREDOM ELECTRIC COMPANY, Dept., F-103
27 Park Place **New York 7, N. Y.**

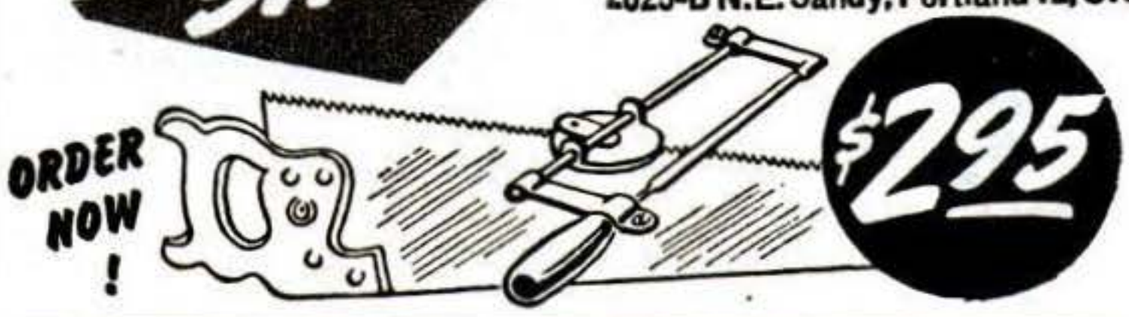
The SPEED SAW FILER

Saves You Time, Money

Now FILE Your Own SAWS

Now you can do expert saw filing at home. Lifetime tool makes precision filing easy for even the most inexperienced. Two simple adjustments make it fit any type hand saw. Keep your saws extra sharp and true-cutting with a Speed Saw Filer. Complete with file, ready to use. Money back guarantee. Cash with order, prepaid (C.O.D. postage extra.)

THE SPEED CORP.
2025-B N.E. Sandy, Portland 12, Ore.



SAVE MONEY! paint your own car

• Do a first class professional job at a fraction of the regular price. A brand new book "Why Not Paint Your Own Car," gives you simple complete step by step instructions and is fully illustrated with numerous photographs. Price **$1.00** Postpaid.

PHOTO-PROCESS CO.
Dept. B **731 So. Flower St.** **Los Angeles 14, Calif.**

BOYS-IT'S FREE!

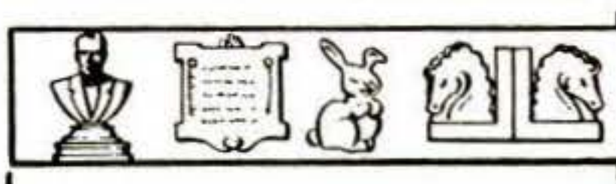
Exciting, new book tells about

"ATOMIC ENERGY"

and "THE WONDERS OF CHEMISTRY"

Also shows how to amaze friends with Chemcraft magic and do many exciting home experiments. Free. Send today!

THE PORTER CHEMICAL CO. 14 Prospect Ave., Hagerstown, Md.



CASTING is Profitable

You can easily make **EXTRA MONEY** casting Bookends, Statues, etc. Complete "Cast-Kit" contains everything needed: 1 qt best Latex; 5 lbs Marblite Casting Clay; 3 Modelers; Scraping Knife, & Full instructions. Only $4.50 postpaid (or COD, plus fee). Valuable 40-page Craft Catalog FREE. **(WVa Orders add 9c Sales Tax.)**

DWINNELL CRAFT SHOP • Dept. PS82, Elm Grove, Wheeling, W. Va.

BUILD YOUR OWN MACHINE TOOLS!

Blueprints $1.00-Catalog FREE

Make your own Milling Machines, Shapers, Drill Presses, 8" Circular Saws, 6" Jointers and similar tools with Lewis ready-to-machine castings. Save up to 80% of finished machine cost. $1.00 brings complete blueprint specifications for above 6 tools. Catalog describing Lewis line sent free with blueprint order.

LEWIS MACHINE TOOL CO.
P. O. Box 7446, Sta. L, Dept. S, Los Angeles 23, Calif.

ALL BELL

THE VEST POCKET is a complete Bell, operating on a 3—5 Mystery Pay-out System. Pay-outs are made in small payout cup in front which is covered by a drop flap. Reels can also be instantly covered with hinged plate, automatically removing the reward plate from sight.

The Vest Pocket's cash box holds $45 in nickels. Machine is easily collected, loaded or served because mechanism, when unlocked, instantly pulls right out of the case. Made for 5c play only. A few days operation should pay for its cost.

Vest Pocket Bell, the World's Tiniest Payout Type.

$99.50 ea. ***Only 8" x 7" x 8". Weight, 15 lbs.***

Send $24.50 Deposit, Bal. C.O.D., F.O.B., Philadelphia

RAKE Dept. PS **609 Spring Garden Street Philadelphia, Pa.**

Copyrighted material

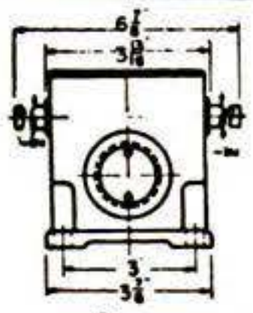
SMALL EFFICIENT SPEED REDUCER

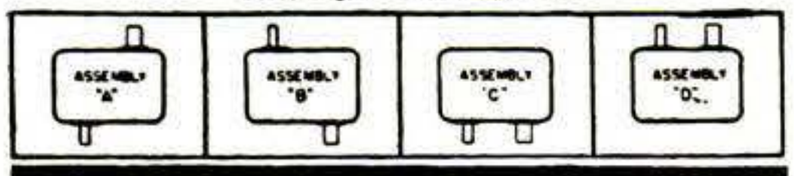
Just the thing for the Home Work Shop, Hobby Shop, Bench Work, Animated Displays, Light Production work. Used daily in thousands of homes and shops. Sturdy, compact, (see dimensions). Case of aluminum. Gears, SAE 65 (British) Gear Bronze. Worm of case hardened steel. Timken Bearings throughout. Torque capacity 100 inch pounds Available in 4 different assemblies (shown below) and in these standard ratios:

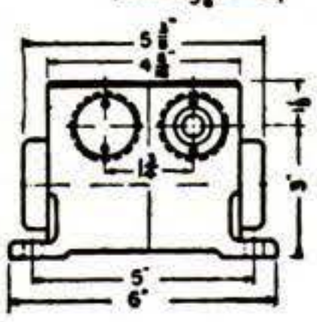
$18.56
NET — POSTPAID

4-1	25-1	64-1	200-1
8-1	30-1	75-1	200-1
10-1	40-1	80-1	400-1
16-1	50-1	100-1	600-1
20-1	60-1	150-1	800-1

When ordering be sure to specify assembly and ratio required. Shipping weight in carton, 8 lbs. Full money back guarantee. **Prompt deliveries.**







THE OHIO GEAR CO.
1422 EAST 179th ST. • CLEVELAND 10, OHIO

HOW TO CUT RAFTERS

New vest pocket book gives lengths, side cuts, plumb cuts, deductions. For all rafters for any building from one inch to forty feet wide. Gives numbers to cut on square. Also degrees for same cuts for Radial Saws. All standard pitches from 1/8 to 5/8. Just open book to pitch page and there are your lengths, side cuts, etc. Anyone who knows what a jack rafter is can frame a roof if he has this great book. Price one dollar ($1.25 in Canada). **Builders' Topics, Dept. S, Lock Box 828, Seattle, Washington.** CARPENTERS, PLUMBERS, PLASTERERS, ELECTRICIANS, ETC. subscribe for Builders' Topics, the monthly magazine for HE-MAN CONSTRUCTION WORKERS. Only $1.00 per year (In Canada—$1.25). Sample copies 25c.

Sand Casting—Forging—Heat Treating—Case Hardening

BRONZE FOUNDRY

In your own workshop allows you to design and build your own GASOLINE ENGINES, STEAM ENGINES, STATUARY, ART OBJECTS, SPECIAL TOOLS, NEW INVENTIONS, ETC. You can also make forgings and case harden steel. Your shop is not complete without a FOUNDRYETTE. Three sizes are available capable of making bronze castings of 1½, 3 and 6 pounds weight, aluminum, copper, brass, etc., $22.50, $29.50, $42.00 f.o.b. Kansas City. Domestic gas supply and 110 volt AC or DC energy required for operation. Write for circular.

KANSAS CITY SPECIALTIES CO.
Box 6022, Dept. S-1 **Kansas City, Mo.**

TORNADO GAS TORCH

The Modern Way of Soldering

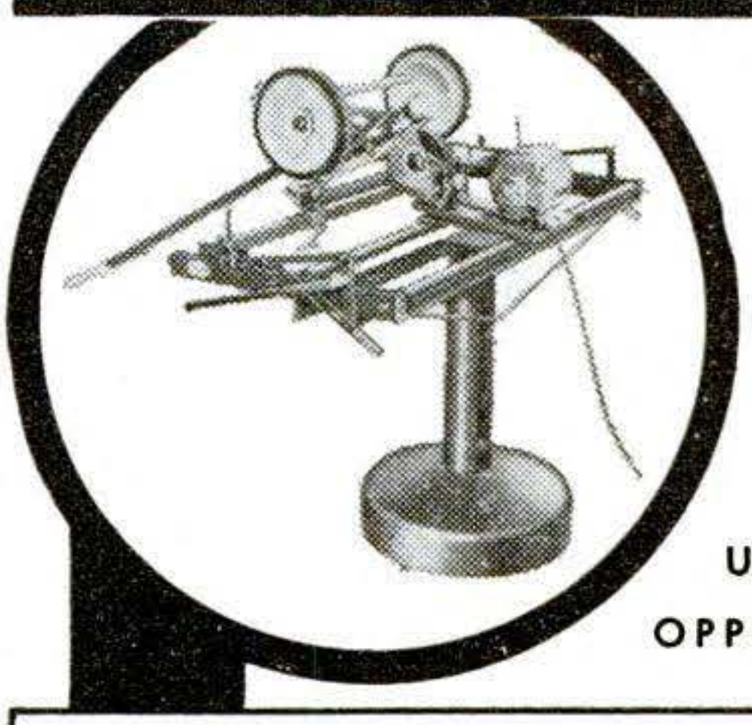
Ideal for hard and soft soldering. Will heat quickly; solder will flow freely and smoothly. No compressed air required. Self-adjusting. Safe. Economical. Can be used for annealing small parts and bending metal parts. Generates a heat of 1700° F. Simply connect to any illuminating gas jet with a rubber hose and operate. Tornado Torch No. 119 comes with three tips, (1/8", 1/4", 3/8" blast).

Tornado Gas Torch No. 119—Complete with 2 tips, for Natural Gas or Bottled Gas; with 3 tips for Manufactured Gas. $2.95 per set. See your dealer or order direct. Send check or money order—post paid.

Robco Corporation, 204 E. 44th Street, New York 17, N. Y.

MAKE UP TO $1000.00

PER MONTH . . . OWN YOUR OWN BUSINESS . . . BE YOUR OWN BOSS



EASY MONEY!
—
EASY WORK!
—
UNLIMITED OPPORTUNITIES!

EVERY HOME OWNER A CUSTOMER!

Sign Long Term Profit Making Contracts With Schools, Parks, Playgrounds, Cemeteries, Golf Courses And All Types Of Institutions.

THE MODERN LAWN MOWER SHARPENER IS A PROFIT PRODUCER FOR YOU!

Make more money the Modern way! Everywhere grass grows and lawn mowers are used offers you unlimited opportunities to make up to $1000.00 per month in a business of your own. For the first time in history, you can sharpen any reel type lawn mower from a five inch edger to a thirty-six inch power mower in from ten to twenty minutes. Dismantling is unnecessary. Handle, wheels, roller and motor remain in place when sharpening even the most complicated mower. The Modern Lawn Mower Sharpener eliminates all hand filing. It precision grinds to extreme ends of both left or right twist reel blades. Bottom knife is held in same brackets for sharpening. No extra attachments required for grinding. Hand, power, gang or fairway units sharpened equally fast . . . equally easy for greater profits. Anyone can operate the Modern Lawn Mower Sharpener. It is simple in design and simple to operate. Send for details today!

START YOUR OWN BUSINESS TODAY

SMALL SPACE REQUIRED - SMALL INVESTMENT

Take steps today to start your own business. Send for FREE bulletin on Modern Lawn Mower Sharpener plus FREE booklet on how to organize your business plus ideas and plans for future expansion. Paste completed coupon to penny postcard and mail today!

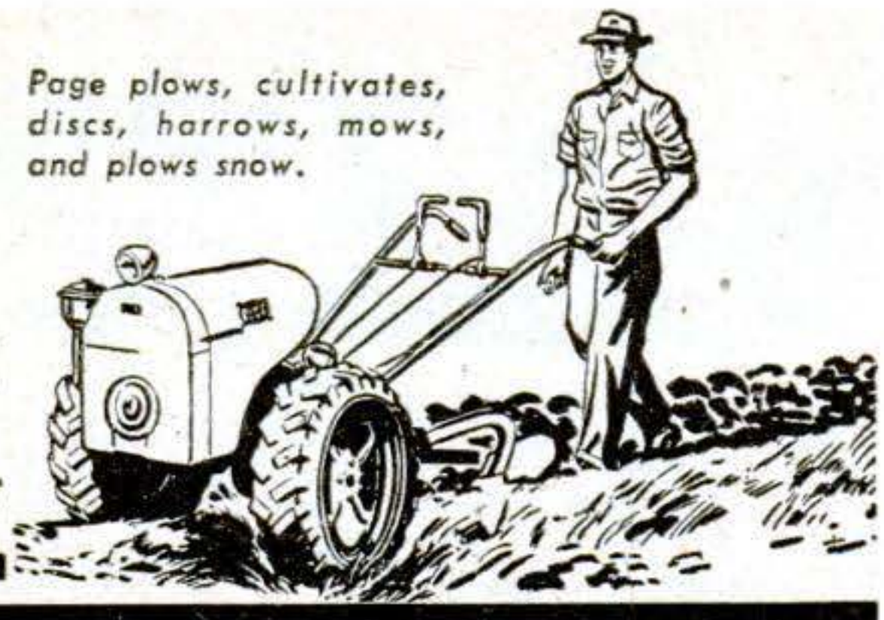
MAIL TODAY

MODERN MANUFACTURING COMPANY
160 N. FAIR OAKS AVE., PASADENA 1, CALIF

Gentlemen: Please send me your FREE booklets No. 11 and 11A.

NAME_____
ADDRESS_____
CITY_____ STATE_____

Copyrighted material



Page plows, cultivates, discs, harrows, mows, and plows snow.

Do it faster and easier — with

PAGE the streamlined Garden Tractor

New 1948 model with new features — including *headlight* and *equipment light* for night work, new quick-change hitch. Page is properly balanced for easy handling. Has direct-drive, worm-gear transmission, using cut gears and ball bearings. No cheap belts or chains. Gears and clutches enclosed in dust-free case. Individual wheel clutches make turning easy. Wheels are adjustable. 1½, 2, 3 and 4 H.P. Prices are surprisingly low. Get the benefits of 20 years' experience.

Write for dealer's name and free catalog.

Page Dairy and Farm Equipment
1916 S. 81st Street Milwaukee 14, Wis.

$34.95

COMPLETE HOME WORKSHOP

Here is power tool pleasure and profit in a ruggedly built, HEAVY steel unit—the Emrick Universal Woodworker. Handles big work. Drill press pulls ½" drill in steel. Saw takes 6" to 8" blade. Lathe 10" swing, 30" centers, spindle dia. ¾". Takes all standard accessories. Sander 8" dia. Emery wheel 5". Bronze bearings, replaceable throughout. Price does not include motor and saw blade. Order today.

10 DAY TRIAL

1759 CLINTON STREET
EMRICK, *Inc.* KALAMAZOO 24, MICH.
☐ Ship on 10 Days Trial. I am enclosing $17.50, balance C.O.D. ☐ Send free literature.
Name_____
Address_____ City_____

NOW YOU TOO CAN BUILD 15 RADIOS

COMPLETE KIT $14.75

Absolutely no Knowledge of Radio Necessary
You Need NO Additional Parts

The PROGRESSIVE RADIO KIT is, THE ONLY COMPLETE KIT. Contains everything you need. Instruction Book, Metal Chassis, Tubes, Condensers, Resistors and all Radio parts.

The 36-Page Book written by Expert Radio Instructors teaches you to build radios in a Professional Manner. You start with a 1-tube receiver. Before you are done with this kit, you will have built 11 Receivers, 1 Public Address System and 3 Transmitters.

SPECIAL FREE OFFER!

Electrical and Radio Tester sent absolutely FREE with each Progressive Radio Kit. PLUS FREE membership in Progressive Radio Club. Entitles you to free expert advice and consultation service with licensed radio technicians.

Write for further information, or ORDER your KIT NOW! ONLY **$14.75**

Postage prepaid with check or money order.
(Postage not prepaid with C.O.D. orders)

PROGRESSIVE ELECTRONICS CO., Dept. 93
497 Union Avenue Brooklyn 11, N. Y.

NEW STOP LIGHT Auto FLASHER

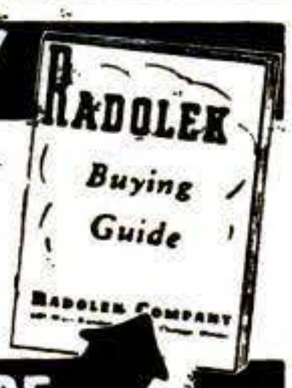
For Fast, Snappy Drivers

Makes your Stop Light Shout. Flashes 115 times a minute. Fully automatic when brake is applied. Approved by leading Safety Engineers. INSTANT ACTING. If your dealer can't supply you, send check or M.O. for $3.00. We pay postage. Dealers and Agents desired.

Patented. Simple to install.

MACCHI and COMPANY
927 Larkin Street • San Francisco 9, California

Everything in Radio!



Make **Radolek** your buying headquarters for Radio-Electronic repair and replacement needs. Large stocks assure finest, most complete selections of all available items at lowest prices. Your orders receive special attention for fastest delivery. Send today for FREE **Radolek Buying Guide.**

RADOLEK CO., Dept. A-028, 601 W. Randolph St., Chicago 6, Ill.

FREE RADIO BUYING GUIDE

MAGIC TRICKS

It's FUN to do MAGIC

Amaze — mystify — entertain. Be Popular. You, too, can enjoy this fascinating hobby which has swept America. Only 10c brings you our famous Catalog of 500 TRICKS, profusely illustrated, containing all the latest in easy-to-do magic for pocket, parlor, stage. Join in the fun! Send 10c today.

Douglas Magicland, Dept. P, Dallas 1, Texas

When PRAYER *FAILS*

The prayers of the most worthy people often fail. Why? The unworthy often have the greatest health, success, riches and happiness. The best, smartest, and most industrious people often have only pain, poverty and sorrow. Why? Thirty years ago, in Forbidden Tibet, behind the highest mountains in the world, a young Englishman found the answers to these questions. His eyes were opened by the strangest mystic he met during his twenty-one years of travels in the Far East. Sick then, he regained health. Poor then, he acquired wealth and world-wide professional honors. He wants to tell the whole world what he learned, and offers to send a 9,000-word treatise, FREE, to everyone who asks promptly. It is a first step to the POWER that KNOWLEDGE gives. There is no obligation. Write for YOUR FREE COPY today.

INSTITUTE of MENTALPHYSICS, Dept. 12-E
213 South Hobart Blvd., Los Angeles 4, Calif.

Copyrighted material

FASTEST PLANER in the WORLD at this Low Price... $195.00

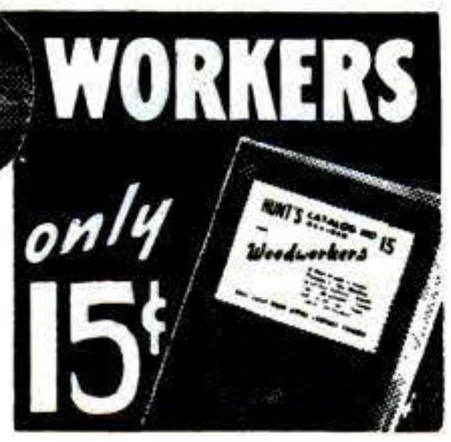
Belsaw Multi-Duty Planer

Needed by every saw mill owner and woodworking shop to Speed Up Production—Increase Profits. Belsaw high speed thickness planer provides for single surfacing stock up to 12" wide by 6" thick at the high speed rate of 24 lineal feet per minute for HIGH PRODUCTION. **Planes green or dry sawed lumber into higher priced, valuable smooth and worked forms.** Machine has welded all STEEL frame...nothing to break. Safety-type all Steel cutterhead runs in heavy duty ball bearings. Three HIGH SPEED Steel knives make 42 cuts per inch for smooth finish. Belsaw Multi-Duty Planer is REALLY ECONOMICAL ...adequately powered by any motor developing 2 horsepower- REALLY PROFITABLE . . . lowest in investment and operating costs, and takes inexpensive attachments for all common planing mill operations: Jointing, Rabbeting, Grooving, Matching. Produces S4S Finish (surfaced four sides) without the great investment required for S4S Surfacers. **Simple accessories provide for SHARPENING and JOINTING its own knives.** You get BIG VALUE in Belsaw, and provide for your progressive growth. **Write for FREE specifications,** illustrations and low prices.

BELSAW MACHINERY CO. 1024 Field Building
315 Westport Rd., Kansas City 2, Mo.
World's largest manufacturer of light sawmill and woodworking equipment

WOOD WORKERS

Lumber—Plywood Available
Harold Hunt wants to send you big new No. 15-A Catalog. Over 148 pages of woodworking ideas. 12 pages of rare woods in colors. UNEQUALED BARGAINS in imported and American woods, supplies, hard-to-find hardware. Send only 15c to cover postage and handling.



CRAFTSMAN WOOD SERVICE CO.
2729 S. Mary St., Dept. B-90 Chicago 8, Ill.

NEWEST OTTAWA LOG SAW

SELF-PROPELLED — MOVES ANYWHERE on OWN POWER

World's fastest Log Saw. Powerful 6 H-P air-cooled motor. Attachments for sawing down trees, buzzing limbs, post hole digging and pulley for belt jobs. Big demand for wood, pulp, posts. Make big money sawing wood this easy way. Low factory-to-user prices. Nothing like it. FREE details.

OTTAWA MFG. CO., 7-801 Pine St., Ottawa, Kansas

Please Send 10c for Catalog 102

MEIER BRASS & COPPER CO
1155 Bellevue, Detroit 7, Mich.

BRASS

For Home Work Shops

Free Cutting Brass Rods
Round, Hex, Sq., ½-Oval
Naval Brass Rods
Round and Hexagon
Brass and Copper Tubing
Brass Sheet

Bill Gets Bass On No. 1 Hawaiian Wiggler

Bill Guegel of Bay Camp, Park Rapids, Minn., writes:

"Here is a picture of myself with a limit string of both big and small mouth bass taken from Bass Lake in northern Minnesota. The No. 1 Hawaiian Wiggler works exceptionally well in rushes and rocky shore lines as this picture shows."

Deep Running No. 1 Hawaiian Wiggler $1.10. See your dealer.

Write for FREE CATALOG

Our new 1948 catalog has many illustrations of record catches and information on our new baits. Write for a free copy.

Fred Arbogast & Co., Inc., 1702 North St., Akron 3, O.

"I'LL TAKE THE WHITE ONE EVERY TIME!"

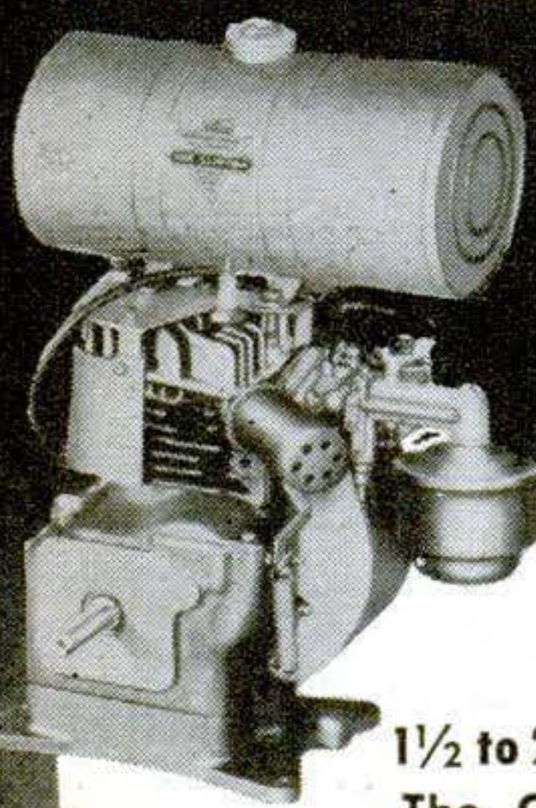
WYTEFACE
TRADE MARK
STEEL MEASURING TAPES

K+E
KEUFFEL & ESSER CO.

Copyrighted material

4 CYCLE AIR COOLED
THE CLINTON ENGINE

IT'S POWERED BEST WHEN CLINTON POWERED



GASOLINE ENGINES

2 Power Ranges

1½ to 2 H.P. 2½ to 3 H.P.

The Clinton Engine is the most outstanding engineering development in over a decade—It gives dependable power for a wide range of applications.

For full engineering data write Dept. 100 PS

CLINTON MACHINE CO.
CLINTON, MICHIGAN

READY CUT HOMES

Order Now

Homes $1655.00 and up. freight paid. Orders filled in order received. Save $500 at least on modern production method homes. Much more compared with builders' prices. Anyone can assemble with simple plans furnished. Complete, including paint, hardware, roofing, glass, nails, etc. Send 35c in coin for full color catalogue showing 57 modern low-priced homes and floor plans. Complete building plans ready for filing at low cost. Sold separately if desired.

NEW COLOR CATALOG FOR ONLY 35¢

STERLING HOMES

INTERNATIONAL MILL & TIMBER CO.
Bay City, Mich.
Dept. PS-28

TRAILER BUILDERS!

Insist on Safety-Engineered

- Bull Dog Hitches and Parking Jacks
- Torq-Less Axles

HAMMER BLOW TOOL COMPANY
D-21 Wausau, Wisconsin

Send for FREE Catalog

INSTALL AND SERVICE OWN OIL BURNER!

SAVE UP TO $150! Send for the famous DELTA PHOTO-INSTALLATION MANUAL. Simple, easy step-by-step photos of a complete oil burner installation. Complete with all necessary plans, drawings and easy-to-follow directions. Published under exclusive copyright at $5.00. **SPECIAL OFFER—CLIP $1 to this ad and mail today!**

". . . am very much pleased with same. . . . I am sure it is the most complete manual ever put out by any company...."B.R., Whitehall, N.Y.

DELTA HEATING CORPORATION, Dept. F
85-03 Northern Blvd., Jackson Heights, New York City

---

make your own *Gems* 29.50 F.O.B.

All necessary lapidary equipment is furnished, including a super-charged diamond blade for sawing, and all wheels for grinding, shaping and polishing; also complete instructions. The complete equipment as shown, less motor and belt, for only $29.50, f.o.b., Burlington, Wisconsin. Write today for information and literature.

B&I MANUFACTURING CO.
Dept. M — Burlington, Wis.

LAW

STUDY AT HOME for PERSONAL SUCCESS and LARGER EARNINGS. 39 years expert instruction —over 108,000 students enrolled. LL.B. Degree awarded. All texts furnished. Easy payments. G.I. Approved. Send for FREE BOOK.

AMERICAN EXTENSION SCHOOL OF LAW
Dept. 86-S, 646 N. Michigan Ave., Chicago, Ill.

Print Your Own

Cards, stationery, circulars, tags, labels, photo and movie titles, advertising, etc. Save money. **Print for Others, Good Profit;** easy rules sent. Raised Printing like Engraving, too. Send dime for press samples, supply book, all details and advice on your needs. No obligation. **KELSEY INC., B-33, Meriden, Conn.**

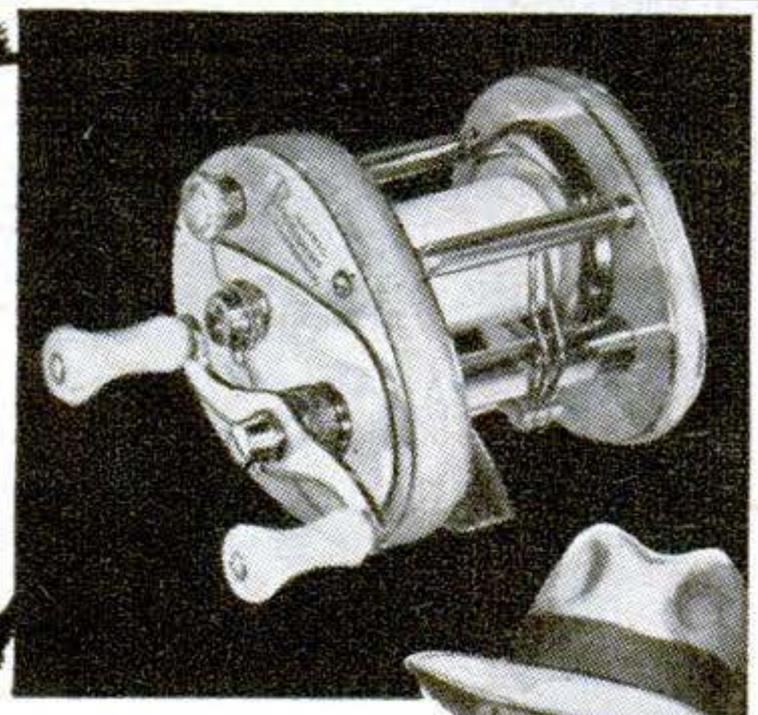
FALSE TEETH

KLUTCH holds them tighter

KLUTCH forms a comfort cushion; holds dental plates so much firmer and snugger that one can eat and talk with greater comfort and security; in many cases almost **as well as with natural teeth.** Klutch lessens the constant fear of a dropping, rocking, chafing plate. 25c and 50c at druggists. . . . If your druggist hasn't it, **don't waste money on substitutes,** but send us 10c and we will mail you a generous trial box. © I. P. Inc.

KLUTCH CO., Box 4894-B, ELMIRA, N. Y.

A Fisherman's Dream Come True!



Shakespeare's NEW PRESIDENT REEL

THE Finest Reel Ever Made

No other reel gives you the *faultless performance . . . all* the 9 better fishing features found expertly *custom-crafted* into the Shakespeare New PRESIDENT Reel!

In smooth, quiet operation . . . in instant response to your every cast, it is a fisherman's dream come true . . . *the finest reel ever made.* No longer any need to envy its fortunate owner . . . now available at your sport store.

Shakespeare FINE TACKLE HONOR BUILT for FIFTY YEARS

FREE TACKLE BOOK and Pocket Fishing Calendar. Reels, Rods, Lines, Accessories, Fishing Tips. Send coupon.

Shakespeare Company, Dept. 92, Kalamazoo 2, Michigan
Send me your FREE BIG TACKLE BOOK and Pocket Fishing Calendar.
Name.....
(Please write address and zone no. below)

Copyrighted material

START A BUSINESS AT HOME...

Like John Lehman, Who Says:

"The complete Fyr-Fyter extinguisher line gives me a steady income and *real* independence."

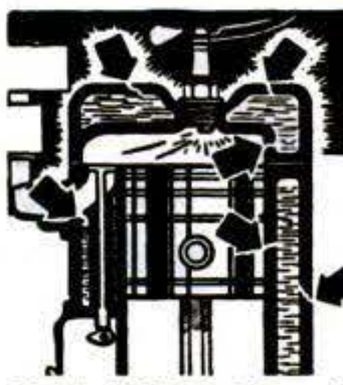
Yes, capable men like John Lehman will find an outstanding opportunity with Fyr-Fyter. You can be your own boss . . . operate in your own town and vicinity . . . build a permanent, steady income. No capital needed. We carry accounts, make deliveries, pay profits weekly. Thousands of prospects due to the vast need for fire protection.

Write for FREE BOOK

Get details on Fyr-Fyter's famous sales kit . . . facts on the complete, Underwriters' approved Fyr-Fyter line . . . how you earn while you learn. Write today! No obligation.

Fine Business for men past 40.

FYR-FYTER CO. Dept. 92-38, Dayton, Ohio

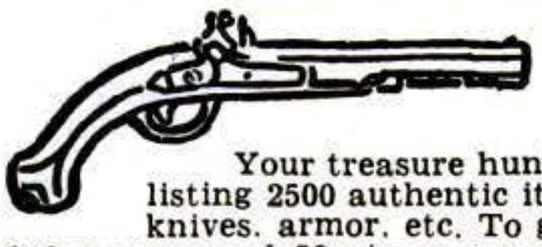


REPAIR CRACKED BLOCKS AND HEADS–

External and internal leaks in blocks, cylinders and valve ports quickly and easily with LUSCO PLASTIC SEAL.

90 day Service Guaranteed or your money back. Send money order or check for full pint—more than sufficient for average repair . . . **$3.00** Postpaid

C. F. LUSK CO., 5916 Bonna Ave., Cleveland 3, Ohio



GUNS-SWORDS FIREARMS

Your treasure hunt ends in our new 156 page catalog listing 2500 authentic items, including old pistols, swords, knives, armor, etc. To get your illustrated catalog of over 156 pages, send 50c to cover postage and handling to **ROBERT ABELS, Box PS, 860 Lexington Avenue, New York 21, N. Y.**

New Designs in

FRANZITE GRIPS

Modernize Your Gun! Improve Your Score!

Most durable grips made. Positively unbreakable! For Colt, Smith & Wesson, Hi-Standard. Ortgies, Luger & Mausers in a wide choice of beautiful designs in ivory, pearl, walnut, onyx, etc. Low prices. FREE CATALOG. Dealers Wanted.

SPORTS, INC., (Mfrs.) 5501 Broadway, Dept. S-2, Chicago 40, Ill.

Now save as you shave

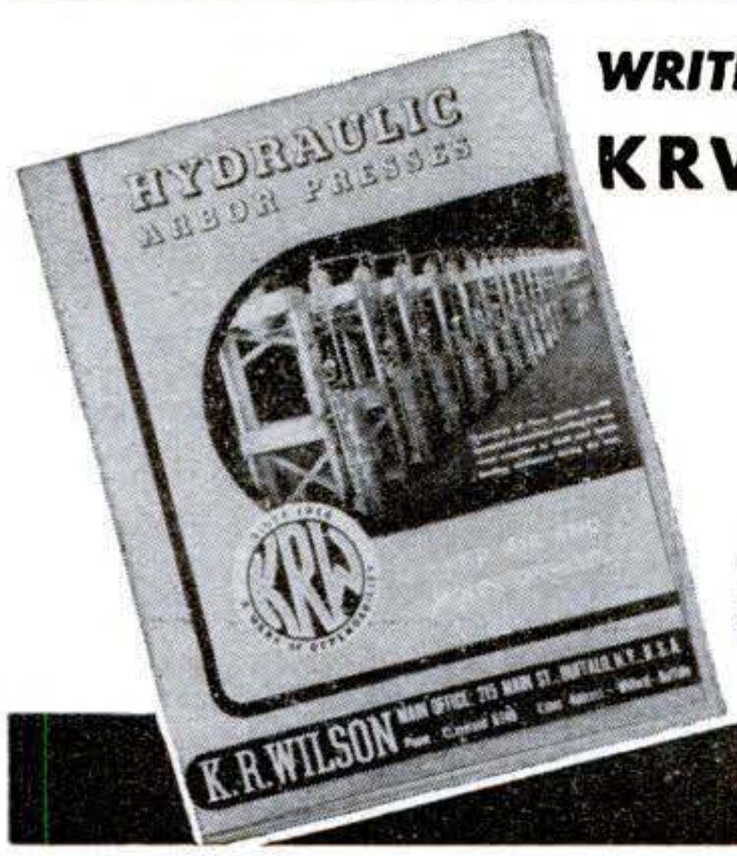
STROPS—CLEANS WITHOUT REMOVING BLADE

RAZOR, STROP AND 5 VALET BLADES $1.25

SELF-SHARPENING . . . ONE PIECE

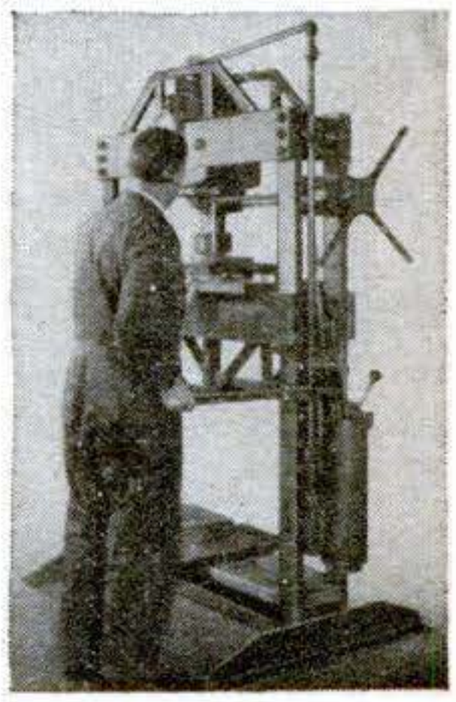
WRITE FOR YOUR* FREE *COPY OF THE NEW

KRW HYDRAULIC PRESS BOOK



Describes all manner of Production and Shop Work on KRW Hydraulic and Bench Type Arbor Presses. 32 pages illustrating the new KRW Hand-operated, Electric-operated and Air-operated Hydraulic Presses.

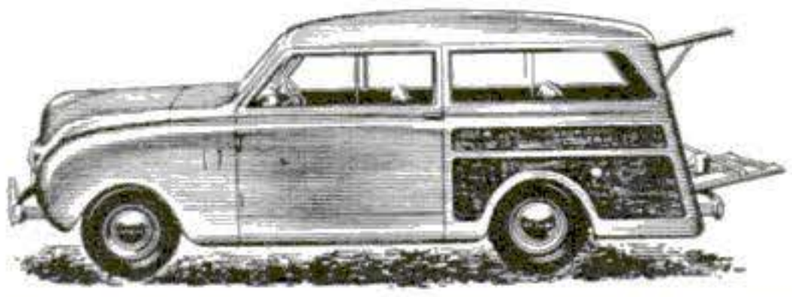
Write for your copy today.



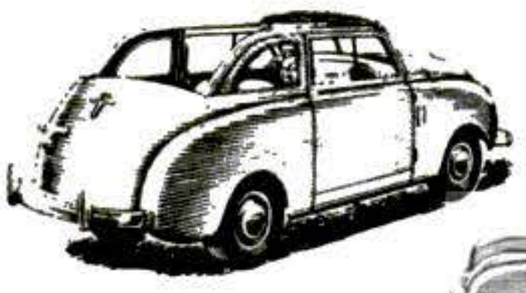
K. R. WILSON, DEPT. 54, 215 MAIN ST., BUFFALO 3, N. Y.

Copyrighted material

NEW CROSLEY STATION WAGON



Smart! Practical! Costs $600 to $700 less than any other station wagon—operates for about ½ as much. Seats 4 in comfort. With rear seat removed hauls ¼ ton load.

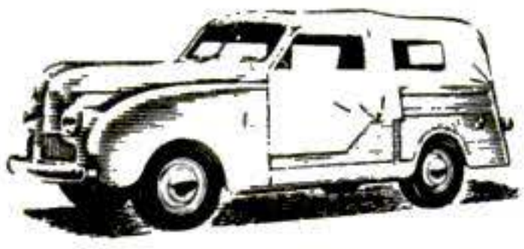


Convertible: If you love sun and air.

Panel Delivery: Full ¼ ton capacity.

Sedan: Over 20,000 now on the road.

Pickup: Cuts service and delivery costs.



Sports-Utility: For work or play — Rear seat obtainable. Low priced even for CROSLEY—$130 less than station wagon.

CROSLEY

a FINE car

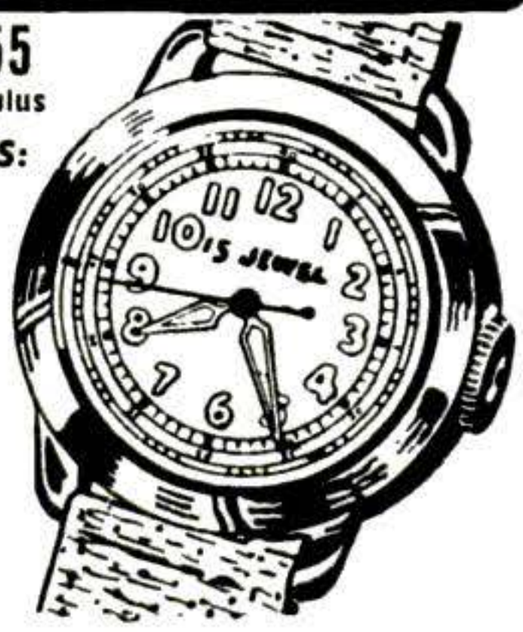
For beautiful, full-color catalog, write: Crosley Motors, Inc., 2532-JJ Spring Grove Ave., Cincinnati 14, Ohio.

Men's Fully Guaranteed NEW $13.95 PLUS TAX

15-JEWEL WRIST WATCH

ORIGINALLY sold up to $55

Sacrificed because they're post-war surplus



LOOK AT THESE FEATURES:

Luminous dial . . . sweep second hand . . . waterproof . . . shockproof . . . anti-magnetic . . . imported Swiss precision movement and case.

You get them now for a small fraction of original prices. Don't delay! Order now . . . while they last. **Send only $1** down payment with order. Pay balance to postman on arrival, plus postage. Or we pay postage if you enclose $13.95 plus $1.39 Fed. Tax.

Receive Reg. $2 expansion band FREE with prepaid order. Money back in 5 days if not delighted. Order now.

MARYLAND DISTRIBUTORS, Dept. 2
501 E. Balto. St. Balto. 2, Md.

POWERFUL AIR PISTOL

"Sportsman Jr." is Safe, Accurate, Heavy; balanced like real automatic. Shoots B-B's, Darts, Pellets. Lots of fun for indoor target practice. 8⅛" overall. With adaptors, ammunition, in attractive gift box. Send $4.95 Check or Money Order. Postpaid.

SIDNEY SMITH INTERNATIONAL
1112 Wilshire Blvd., Dept. PS-2, Los Angeles 14, Calif.

LATHE ACCESSORIES

● NEW Time and Money Saving Items for your Metal Working Lathe—LATHE MANDRELS in sets with a **new** and **unusual feature**—CENTER DRILL ARBOR sets—STUB MANDRELS—DUAL-PURPOSE BALL BEARING CONE and PIPE CENTERS for auto and electric motor ARMATURE and PIPE and TUBING WORK—EXTRA LONG HARDENED CENTERS—EXTRA LONG CUT-AWAY CENTERS—MORSE TAPER REAMERS—DRILL ROD—FLAT GAGE STOCK—CASE HARDENING COMPOUND—ETC.

Send 10c (coin) for complete descriptive literature on these hard-to-get lathe accessories.

HURON MACHINE & TOOL CO.
Yale 5, Michigan

MAKE MONEY AT HOME

RUBBER MOLDS. *Low as* 6¢ EA.

Amazing rubber mold-making outfit makes perfect flexible molds of plaques, ash trays, bookends, etc. Molds cost 6c to 25c each. Each mold makes hundreds of novelties and gifts to sell for $1.00 apiece and more! No experience necessary. Everything furnished. Quick and easy. Start profitable business in your home—sell to stores, gift shops, friends, resorts, road stands, by mail. Full or spare time. Write for complete FREE details and easy instructions.

SO-LO WORKS, INC., Dept. D-801, Loveland, Ohio

AIR RIFLES **BENJAMIN** AIR PISTOLS

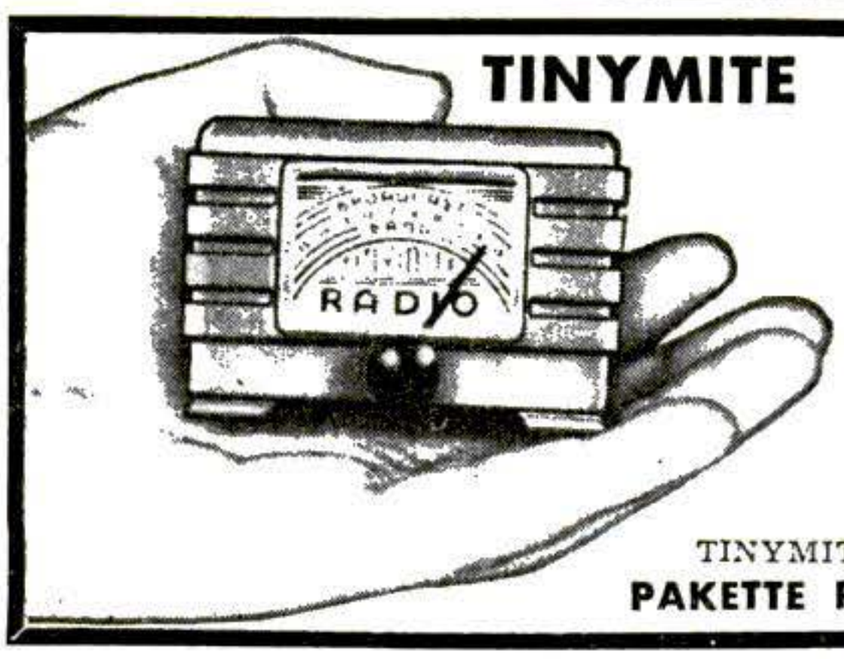
PIONEERS - LEADERS

SEND FOR FREE FOLDER OF LATEST MODELS TODAY

If you want a **REAL GUN** for **PRACTICAL USE** inside or outdoors get a **SAFE - CLEAN - ECONOMICAL - BENJAMIN** with Adjustable Power and Amazing Accuracy. For **BEST RESULTS** use **BENJAMIN H-C PELLETS. WRITE AT ONCE.**

BENJAMIN AIR RIFLE CO., 811 MARION ST., ST. LOUIS 4, MO.

TINYMITE



MIDGET RADIO!

FITS IN YOUR HAND! ONLY ¼ LB. Beautifully molded red cabinets! **No tubes—batteries or electric "plug-ins" needed!** Has scale dial—personal phone, **new type** fixed power crystal diode. **One Year Service Guarantee.**

GUARANTEED TO WORK on local stations if used as directed. **USE MOST ANYWHERE in bed, hotels, offices, farms, homes, etc.**

SEND ONLY $1.00 (bill, money order, check) and pay postman $2.99 plus C.O.D. fees on arrival or send **only** $3.99 for postpaid delivery!

Complete—Ready to play—Excellent gifts for boys and girls. ORDER YOUR TINYMITE RADIO TODAY **AT THIS BARGAIN PRICE!** (Foreign $5.00 U. S. cash.)

PAKETTE RADIO COMPANY, INC. Dept. TPS-2 KEARNEY, NEBRASKA

Copyrighted material

Wagemaker WOLVERINE BOATS

SPEED—COMFORT—ECONOMY

Nowhere will you find a boat that will give you more for your boating dollar. Wagemaker "Wolverine" Boats set the pace for performance and reliability, at prices you can afford. Many Molded Plywoods in 12'-14'-16' lengths in De Luxe and Super De Luxe Models. Also popular Round Bottom Strip Boats. Over 60 models, a boat for every purpose. Free literature. Why not attend International Sports, Travel and Boat Show, Chicago, February 27 thru March 7, 1948. The only show approved by the Outboard Boating Club of America.

WAGEMAKER COMPANY
Dept. 26 Grand Rapids, Michigan

CARBIDE SCRIBER
NON-MAGNETIC

FOR HARDEST STEEL, GLASS, ETC.

Tungsten Carbide—the hardest metal made by man—carefully ground on diamond laps, brazed into stainless steel 6" handle for marking steel and other metals—for etching, marking, cutting glass. Cuts all directions. Easy to follow any contour. In plastic case with pocket clip.

$2.00
PRICE POST PAID

Dealers, Distributors and Salesmen Wanted

LUCAS-MILHAUPT ENGINEERING CO.
5051 SOUTH LAKE DRIVE • CUDAHY, WISCONSIN

Woo-Wee wolf whistle AUTO HORN

Reproduces "Wolf Whistle" better than any sailor. Screeches, barks, whistles, imitates siren, moves any "road hog" off the highway in "double quick plus" Attract more attention than by driving a yellow Cadillac. Operates from manifold Installed on any car in 15 minutes. Sturdily constructed. Cleverest novelty since the use of the auto Be the first user in your neighborhood. Dealers wanted Absolute money back guarantee. 6 dollars each Order today Ohio orders add 3% tax.

THE PROTECTUROD COMPANY - Dept 102
4033 Windsor Road · Youngstown 7, Ohio

SOUTH BEND LATHE COLLETS

Steel and *Brass* Collets for use in any make of lathe or other machine that they will fit.

SPECIFICATIONS

Collet No.	Thread Dia. In.	Thread Length In.	Th'ds Per In.	Body Dia. In.	Collet Length In.	Head Dia. In.	Head Taper Deg.
3	.650	3/4	26	.6495	2-11/16	.852	12
2	.855	13/16	20	.8595	3-5/16	1.095	15
5	1.250	3/4	20	1.2495	3-9/32	1.452	10
4	.950	13/16	20	.9495	3	1.150	10

	No. 3	No. 2	No. 5	No. 4
STEEL COLLET	$3.75	$4.00	$4.75	$4.25
BRASS COLLET	2.00	2.25	2.50	2.35

SOUTH BEND LATHE WORKS 456 E. Madison St. South Bend 22, Ind.

TESTED DRILL PRESS TOOLS FOR HOME CRAFTSMEN

MULTI-PURPOSE WOOD PLANER

Fits any drill press. Exclusive hi-speed blade design performs precision surface planing, rabbeting, tenoning, paneling, grooving, routing, beading. Thousands now in home workshops, schools, cabinet and pattern shops. An indispensable lifetime tool for wood and plastic workers. Complete **$7.50**

NEW STYLE DRUM SANDER

Fits any ½" drill press chuck. Used for sanding curves, contours, straight edges. Has many essential workshop applications. Complete with 5 spiral sanding sleeves. . . . **$3.95**

4" ROTARY SURFACE SANDER

An exclusive type sander for drill presses, flexible shafts, motors, hand drills. Instantly sands woods, plastics and metals to agate smoothness. No waves, ripples, striations. Discs immediately interchangeable. With 20 discs. . . **$5.95**

ALL METAL SHAPER FENCE

Precision built of hard alloy aluminum and steel. Nothing to rust. No wooden parts to warp. For moulding, jointing, shaping, rabbeting, tenoning. Fits all standard drill presses—shapers. Complete with two hold down springs. A real buy at **$7.95**

AT YOUR DEALER—OR ORDER DIRECT
FREE Workshop Catalog →
BARRON TOOL COMPANY, INC.
270 Architects Bldg., Detroit 1, Mich.

BARRON PRECISION WORK SHOP TOOLS

Now for EVERY WORK SHOP!

NEW Invention

Electroplates by BRUSH

Easy to Plate CHROMIUM
GOLD, SILVER, NICKEL, COPPER
. . . For Pleasure and Profit!

If you have a workshop—at home or in business—you need this new Warner Electroplater. At the stroke of an electrified brush, you can electroplate models and projects—you can replate worn articles, faucets, tools, fixtures, silverware, etc. with a durable, sparkling coat of metal . . . Gold, Silver, Chromium, Nickel, Copper or Cadmium. Method is easy, simple, quick. Everything furnished—equipment complete, ready for use. *By doing a bit of work for others, your machine can pay for itself within a week.* So make your shop complete by getting a Warner Electroplater right away. Send today for FREE SAMPLE and illustrated literature. ACT AT ONCE! *Mail Coupon.*

WARNER ELECTRIC CO., DEPT. R-30
1512 Jarvis Avenue, Chicago 26, Ill.

FREE Details & Sample!

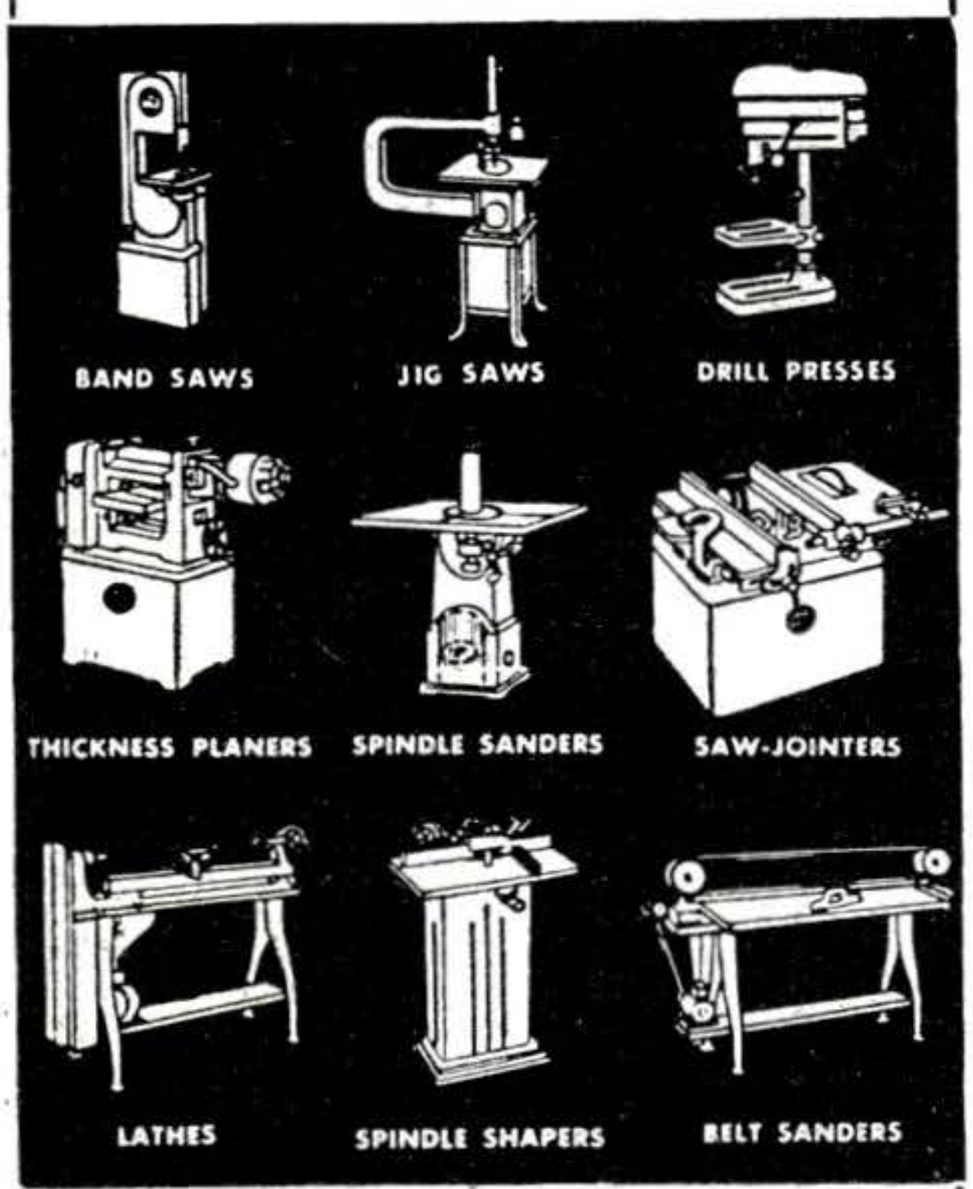
WARNER ELECTRIC CO., 1512 Jarvis Avenue, Chicago 26, Dept. R-30
Gentlemen: Send Free Sample and Details to:

*Name*_____
*Address*_____
City *State*

Copyrighted material

BOICE-CRANE POWER TOOLS

for shop men and homecraftsmen.



Write for literature on this versatile, low-cost, sturdy line.

BOICE-CRANE COMPANY
944 Central Ave., Toledo 6, Ohio

BUILD YOUR OWN TRAILER

Get these Modern Complete Plans

Select just the model you want—for hunting—travel—camping—or as a home. Each plan is complete with simple, step-by-step instructions and a bill of materials. Easy to follow. Three models!

STOCK No. H27 NATIONAL MODEL 27. A sleek 27-foot trailer with 3 rooms, lavatory, etc. Sleeps six. complete plan $1.00

STOCK No. H20 NATIONAL MODEL 20. A good-looking, easily-built 20-ft. trailer. 3 rooms, sleeps four. complete plan $1.00

STOCK No. H10 NATIONAL CAMPER. A compact unit for traveling, camping, hunting, fishing. Sleeps two. Complete plan .50

Special—Order all 3 of above plans.....$2.00

FREE! *Big parts catalog with any order*

NATIONAL TRAILER STORES
Dept 9 Box 2353 Terminal Annex — Los Angeles 54, Calif.

TALK-SING *thru your own radio with* **RADIO MICROPHONE**

Be the life of the party. Put on your own broadcasts at home. Talk-Sing, make announcements from any room. Wonderful voice practice. Microphone easily attached to any radio. Follow enclosed instructions. SEND NO MONEY—pay Postman $1.98 plus postage. Send Money Order or check and save postage.

EMPIRE RADIO & TELEVISION CO. (Dept. R1) 1521 Bedford Ave., Brooklyn 16, N. Y.

A PENNY POSTCARD MAY CHANGE YOUR FUTURE...

Get full information on the coin-operated vending machine industry. Start with a few machines and build a wonderful future. We'll give you complete advantage of our "know-how." Send for Free Booklet Today—**No Routes Sold!**

PIONEER VENDING SERVICE
ADDRESS ALL MAIL TO DEPT. PS
461 SACKMAN ST. • BROOKLYN 12, N. Y.

NEW CHEMICAL MITT

Sensational! DRY Window Cleaner! Uses no water, no messy liquids. Chemically Treated. Simply glide over windows; leaves glass sparkling clear. No heating water, no heavy buckets to carry. No rags, powders, sponges, chamois. No mess or muss. No red chapped hands. Dust, dirt, grime, fog disappear like magic. *Wonderful for auto windows, windshields!*

SAMPLES FOR AGENTS Sample offer sent immediately to all who send name at once. A penny postal will do. SEND NO MONEY—*just your name,* **KRISTEE CO., 699 Bar Street, AKRON, OHIO**

Now She Shops "Cash And Carry"

Without Painful Backache

Many sufferers relieve nagging backache quickly, once they discover that the real cause of their trouble may be tired kidneys.

The kidneys are Nature's chief way of taking the excess acids and waste out of the blood. They help most people pass about 3 pints a day.

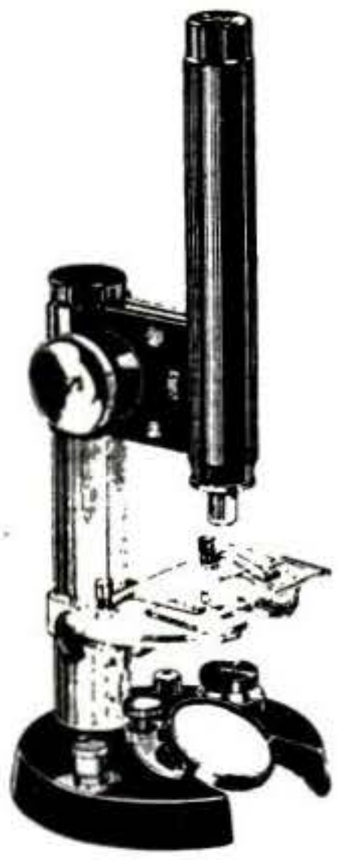
When disorder of kidney function permits poisonous matter to remain in your blood, it may cause nagging backache, rheumatic pains, leg pains, loss of pep and energy, getting up nights, swelling, puffiness under the eyes, headaches and dizziness.

Don't wait! Ask your druggist for Doan's Pills, a stimulant diuretic, used successfully by millions for over 50 years. Doan's give happy relief and will help the 15 miles of kidney tubes flush out poisonous waste from your blood. Get Doan's Pills.

PAN-TEK 192-POWER

MICROSCOPE

$39.50



Complete with two eyepieces, separable objective, substage condenser and duplex mirror.

Fully corrected to give the four magnifications of 24X, 48X, 96X and 192X, with resolving power and size and flatness of field unsurpassed by laboratory instruments costing several times this price.

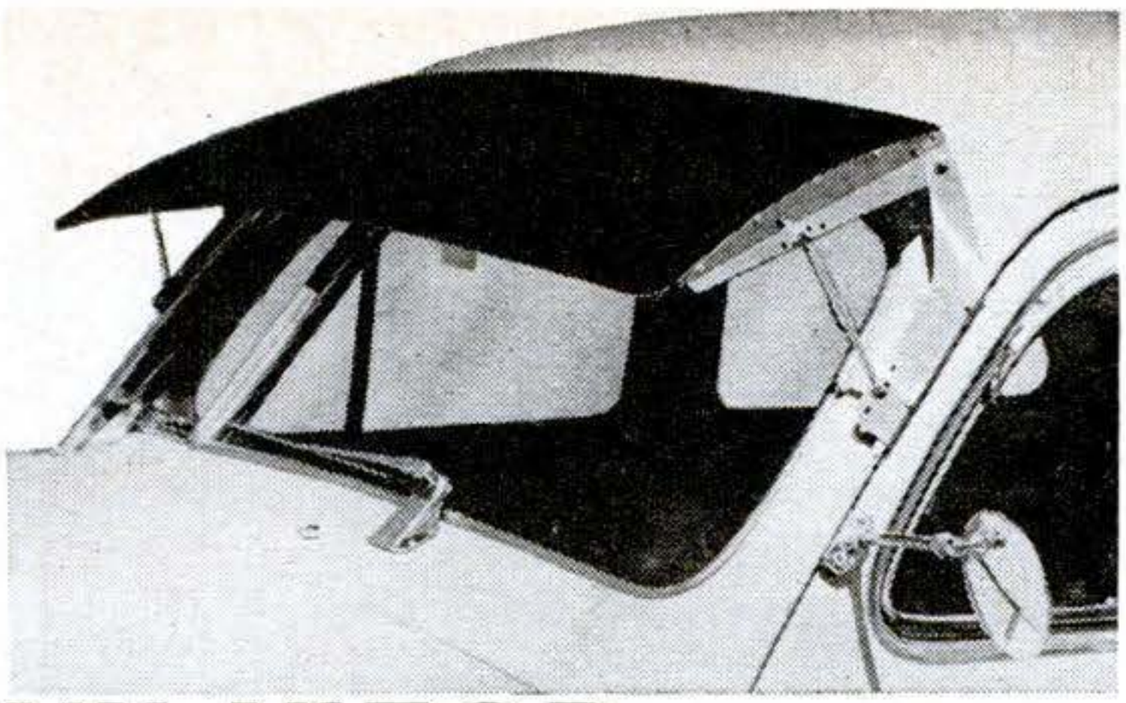
All-metal construction, finished in baked enamel, nickel and chromium.

Price, postpaid in U.S.A. $39.50
($10.00 deposit on C.O.D.'s)

Trade inquiries invited

PAN-TECHNICS, LTD.
ENCINITAS CALIFORNIA

Copyrighted material



VU-VIZOR *The New*

TRANSPARENT PLASTIC SUNSHADE

* Enables you to see traffic lights. Also cars ahead while driving down grades. Eases night driving. Designed to conform to contour of your car. Carefully constructed of the heavy transparent plastic used in aircraft. Polished stainless steel brackets hold shade rigid to car. Will not tear or rust. Readily mounted on all models. Shipped complete with all necessary screws, nuts, etc. for easy permanent installation. State make, model and year of car.

Send order direct or write for literature

$38.95 F.O.B. Huntington Beach, Calif.

NU-WORLD PRODUCTS CO.
303 Third St., Dept. PS-2, Huntington Beach, Calif.

ELECTRIC SHEAR SHARPENER

OVER 35,000 SOLD—IT MUST BE GOOD!

Genuine Carborundum wheel ideal for shop or home use. Send remittance with order and shipment will be made at once, prepaid to your door, complete with electrical goods catalogue.

$9.75 complete with vise

WILLIAM MARVY COMPANY, Dept. 6
479 St. Peter Street St. Paul 2, Minn.

SHOE REPAIR

OFFERS BIG INCOME

LEARN IN 12 WEEKS TIME

In 12 weeks time you can own your own shop or earn big income as skilled shoe repairman. Growing demand everywhere at top wages for men who know how. We teach you quickly by actually working on shoes and modern machines. Costs nothing under G.I. Bill of Rights. We help you get big pay job or start your own shop in 12 short weeks. School open to all from 18 to 60 years of age. FREE BIG 16 PAGE BOOK explains everything. Send for your copy today.

MODERN SHOE REBUILDING SCHOOL, *Established 1927*
2937 Belmont Ave., Chicago, Ill. RUSH POSTCARD TODAY!

MAKE *sure* OF BETTER PICTURES

2 great G·E meters to help you!

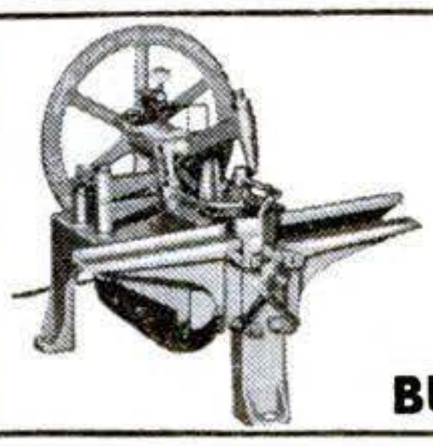
Get perfect shots every time . . . movies or stills. Easy with either one of these great G-E exposure meters. Tells you how to "set" your camera for full detail, rich color. Simple to use. Ask your photo dealer. *General Electric, Schenectady 5, N. Y.*

Famous Type DW-58. Extremely accurate. Sturdy. Dependable. A big value for only **$19.95***
Federal tax included.

New! Deluxe Type PR-1. Remembers the light it sees . . . sensitive, compact, easy to use. Ask for the meter with a MEMORY! **$32.50***
Federal tax included.

*In states where Fair Trade Contracts are in effect.

GENERAL ELECTRIC
606-13



AUTOMATIC SAW SET

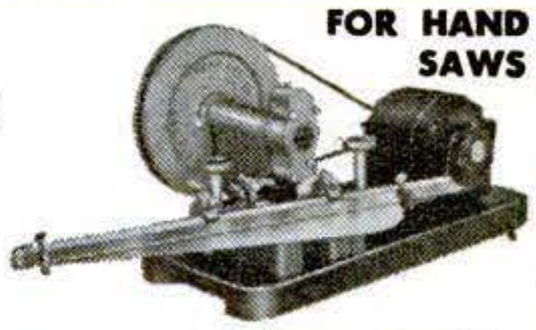
Set saw teeth automatically on hand or band saws—400 per minute without effort. Perfect hammer and anvil action sets teeth uniformly—no tooth breakage.

★ **IMMEDIATE DELIVERY**
WRITE TODAY

AUTOMATIC RETOOTHER

Cuts new saw teeth in 50 seconds—any size 4 to 16 points. Old teeth fall off as chips. Easy to operate. A perfect job.

FOR HAND SAWS



BURR MFG. COMPANY, 8943-N Venice Blvd., Los Angeles 34, Calif.

FREE Sample Of New PLASTIC Shows How To Make Leather *and* Leatherette *LIKE NEW!*

MAGICALLY CHANGES CLOTH TO IMITATION LEATHER

SAVE MONEY - TIME AND EFFORT by renewing Luggage—Leather Covered Furniture - Golf Bags - Auto Seat Covers—Restaurant Furniture, Booths or any Leather or Leatherette item with new plastic discovery called Leather-New. Coat cloth or cloth covered items such as Glider Cushions, Tarpaulins, Porch Furniture, Etc. and make them look and wear like they were leather. Spreads easily with brush or spray gun—leaves NO BRUSH MARKS. Simple Acids, Caustics and Alcohols do not stain this finish—It is sun and mildew proof. Stays Fresh and Clean as long as real leather. Comes in all standard colors. Just mail coupon for Free sample of Leather-New coated material which shows effects.

OWN A PROFITABLE LIFETIME BUSINESS

Cash in on big profits to be made in this new business. Profits up to $700.00 monthly possible, renewing booths and furniture for bars, restaurants, grills, movie houses, etc. Mail name and address on 1c postcard—I'll show you how. Jack Edwards, Sales Mgr.

LEATHER-NEW PRODUCTS, Leather-New Bldg., 4723 Troost, Dept. S-2, Kansas City, Mo.

JUST MAIL COUPON

No Obligation

Leather-New Products, Leather-New Bldg., 4723 Troost, Dept. S-2, Kansas City, Mo.

Name . . . . . .

Address . . . . . .

City . . . . . State . . . . . .

Fill Out—Mail Today

Copyrighted material

TO: Reader
FROM: Editor

Plain Talk About The Tucker

QUITE a few readers have written me asking why POPULAR SCIENCE has never had a piece about the much-publicized Tucker car. Some letters mention the articles and photographs that have appeared in newspapers and in other magazines. Others ask what we think of the car and the innovations described in the advertisements.

This situation points a blunt finger at an important editorial commandment of POPULAR SCIENCE. This magazine aims to report not only what is new or what it means, but also *how it works*. So we have to know more than most publications to get a story into our kind of pictures and print.

A fine example of how we must answer to you readers (and the ever-present experts in everything among you) is the story of Buick's new Dynaflow in this issue. From the time we heard the first trade rumor that Buick was readying a really new kind of transmission, we knew this was our kind of meat.

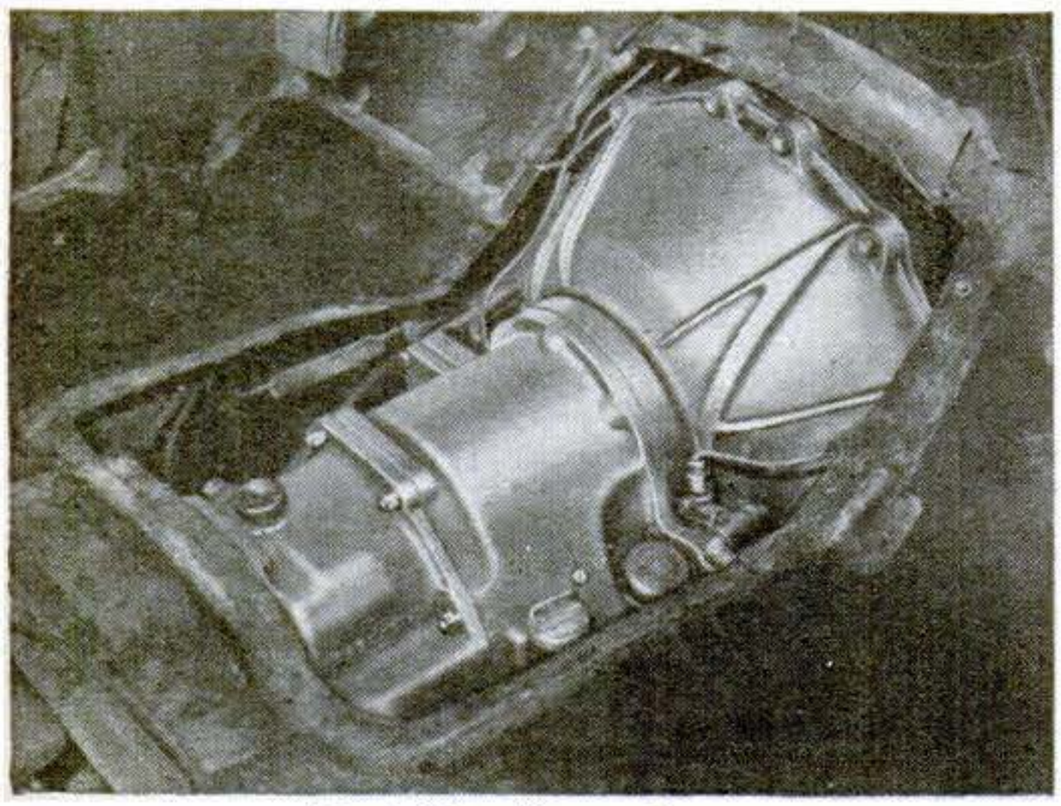
We assigned a reporter. He checked through General Motors in New York, caught a plane to Detroit. He drove a car equipped with Dynaflow and was quickly convinced it was one of the biggest automotive stories ever.

But, while understanding *what* it does was easy, explaining *how* it works was one of the toughest nuts ever cracked with a typewriter and a sketch pad. Our man spent hours that stretched into days groping through blueprints, poring over texts on hydraulics, interviewing engineers, probing other manufacturers for reactions.

The same man has been chasing the Tucker story in the same way for months. So far, we haven't caught it. And it isn't because we haven't tried. We've had reporters scouting New York, Detroit, and Chicago. Our man poked around the polished exhibition chassis. He was told the power from the rear engine was delivered to the rear wheels through hydraulic torque converters. He asked how they worked. The Tucker people said it was a secret.

Now POPULAR SCIENCE has only the highest regard for the ambition of Mr. Preston Tucker to bring forth a new automobile that incorporates so many fresh approaches to the tough, old problems of design and engineering. We appreciate the economic difficulties of starting a new company and the production difficulties in getting a radically new car on the assembly line.

But the stock market and the steel market are not our editorial concern. Our field is the car, not the company. Dealing with the hard mechanics of how-it-works, even our best artist can't draw a picture of a claim. So until we can do a job like the Dynaflow story on the Torpedo, the envelope marked "Tucker" in our morgue will still carry a scrawled "NO STORY."

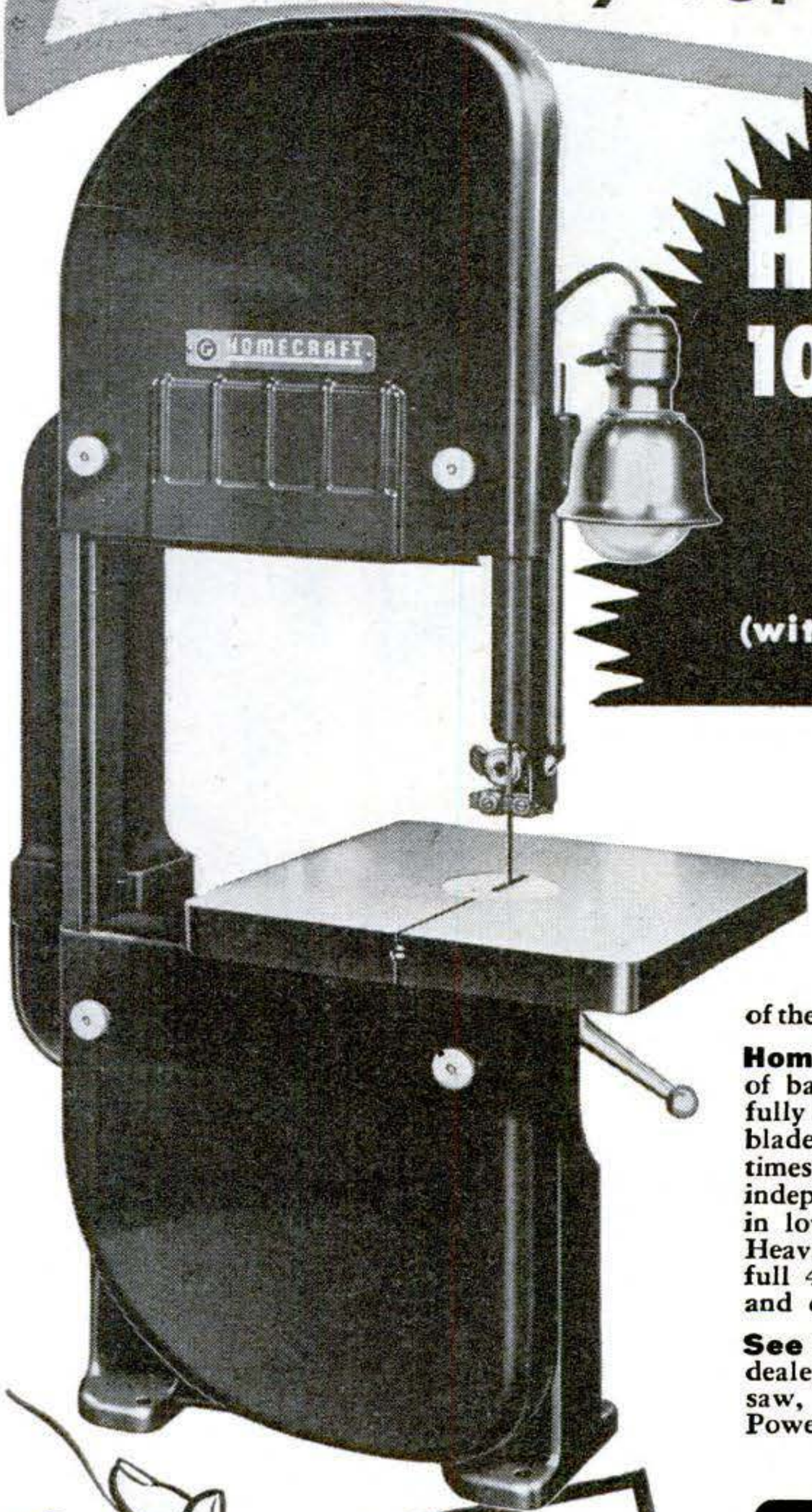


Buick's Dynaflow

Tucker's Torpedo

Copyrighted material

New! Economy-Priced! Built expressly for the home shop!



HOMECRAFT®
10-inch Band Saw

No. 28-110

Only $36.95

(without motor or lamp attachment)

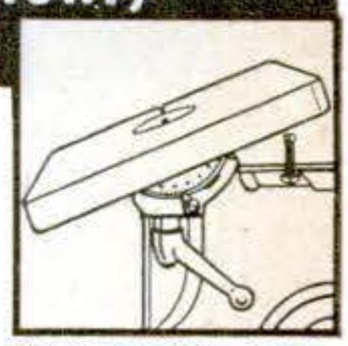
A practical hobbyist's band saw that has 6½" capacity under the guide and a throat capacity of 9⅝"

The 28-110 *Homecraft* Band Saw is an outstanding hobby-shop tool! It fulfills the demand for a good, dependable, popular-priced tool that fits the needs of the average hobbyist who "tinkers" with wood.

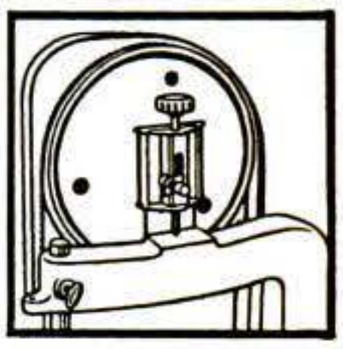
Homecraft features like this add up to a lot of band saw for the money: Blade guides are fully adjustable for different sizes and types of blades. Correct tension is kept on blade at all times. Ball-bearing blade support is adjustable independent of blade guides. Bronze bearing in lower wheel; needle bearing in upper wheel. Heavily-ribbed 10" x 10" cast-iron table tilts full 45° for angle-cutting, has convenient scale, and can be securely locked in place.

See It At Your Dealer! Ask your *Homecraft* dealer to show you this No. 28-110 new band saw, and his complete display of *Homecraft* Power Tools priced from $29.95 to $39.95.

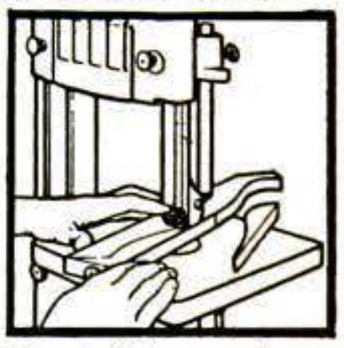
Visit your Homecraft dealer now!



Tilting table locks quickly and securely in place. Convenient scale tells you the angle of tilt.



Wheel-tension and blade-tracking adjustments provide handy means of aligning blade and keeping correct tension at all times.



For safety, protection is provided by front blade guard which adjusts up and down with blade guides and ball-bearing blade support.

ROCKWELL **HOMECRAFT® POWER TOOLS**

General Sales Office — Chicago 2, Illinois

Descriptive Literature! Shows all Homecraft Power Tools and accessories. Sent to you free. Use coupon below, to get your copy.

HOMECRAFT POWER TOOLS

are built by the makers of the famous Delta-Milwaukee Power and Machine Tools, the acknowledged leaders in accuracy, safety, and dependability. Thousands of Delta tools are used today in industry, in schools, and in home shops too. So, if your goal is the finest shop obtainable, equipped with high-quality power tools that embody the very finest principles of engineering, design, and construction, then insist on Delta-Milwaukee Power Tools.

*Trade Mark Reg. U.S. Pat. Off.

HM-56

Tear out coupon and mail today!

DELTA MANUFACTURING DIVISION
Rockwell Manufacturing Company
683B East Vienna Ave., Milwaukee 1, Wisconsin

Please send descriptive literature on **Homecraft** Power Tools.

Name_____

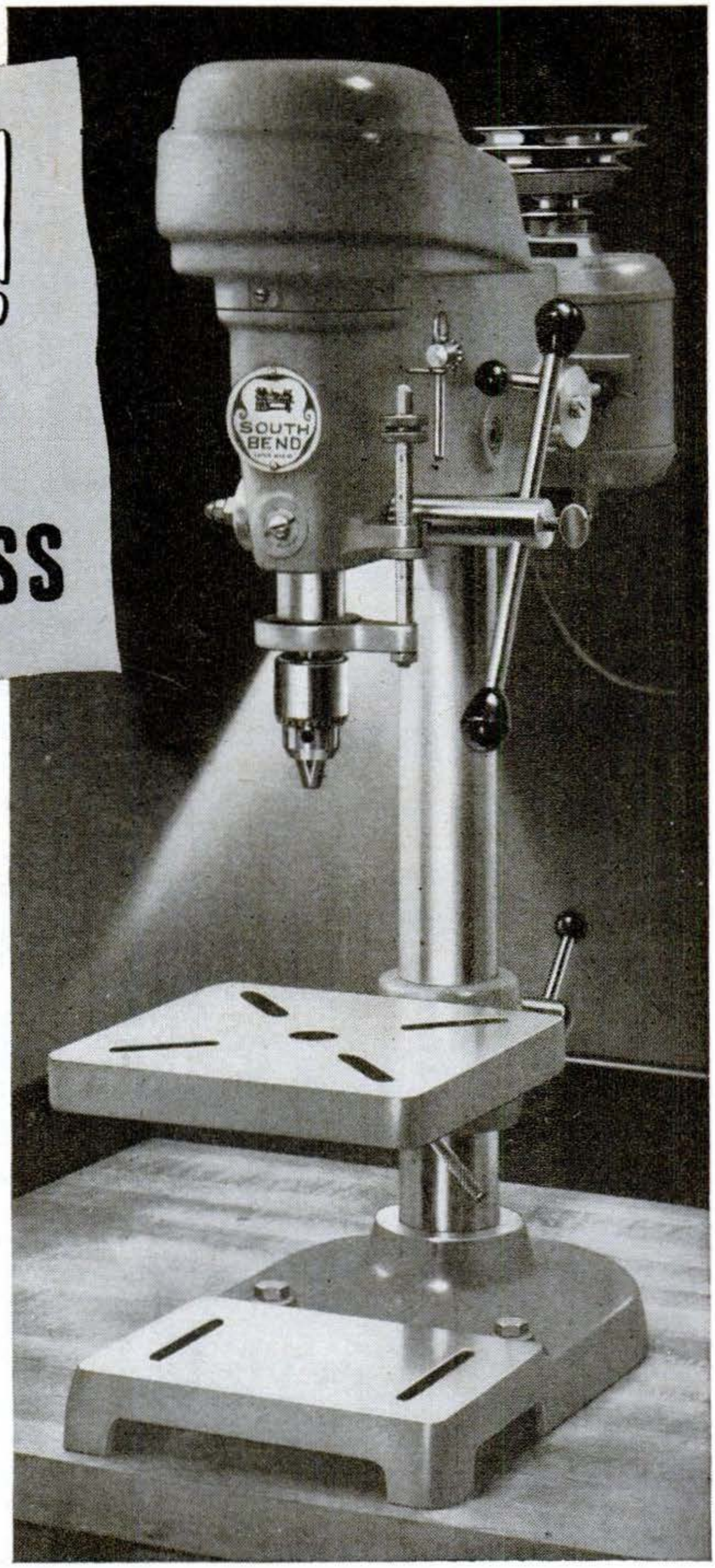
Address_____

City_____(____) State_____

Copyrighted material

NEW!

SOUTH BEND 14" Drill Press



South Bend presents this new 14" Drill Press as a companion to the South Bend Precision Lathe. It is built with the same high standards of accuracy and skilled workmanship. Years of painstaking research and experimentation have gone into its designing. This has resulted in a superior tool that is unsurpassed for accuracy, ease of operation, versatility and dependable performance.

FEATURES and SPECIFICATIONS

BELT TENSION RELEASE
Quick-acting belt tension release lever simplifies speed changes. Keeps tension correct.

BUILT-IN LIGHT
Provides shielded illumination for work area. Separate on-off switch.

SPINDLE
Free-floating design prevents misalignment, side thrust, and whip. Travel . . . . . 4"

BALL BEARINGS
Sealed, precision type. No oiling. 2 on spindle drive unit, 2 on spindle.

QUILL BEARING ADJUSTMENT
Compensates for wear.

DEPTH GAUGE
Graduated in inches. Adjustable collars control feed and return.

RUGGEDLY CONSTRUCTED
Precison-built for industrial and all other types of shops.

TWO MODELS
Bench or floor type.

CAPACITY
Maximum drill size in iron or steel . . . . ½"
Drills to center of 14" circle.

CHUCK
Capacity . . . . 0 to ½"

SPEEDS
Four—707 to 4322 r.p.m.

CHUCK TO BASE DISTANCE
Bench Model . . 17"
Floor Model . . . 46½"

TABLE SIZE
10" x 10" . . Tilt Type

COLUMN
2¾" diameter. Accurately ground.

HEIGHT
Bench Model . . . 35½"
Floor Model . . . 65½"

SHIPPING WEIGHT
Bench Model . 195 lbs.
Floor Model . 235 lbs.

MOTOR REQUIRED
⅓ h.p., 1725 r.p.m. Vertical mounting. On-off switch provided.

$98.00 f.o.b. factory, with chuck, extension cord and switch; less motor.

SOUTH BEND LATHE WORKS

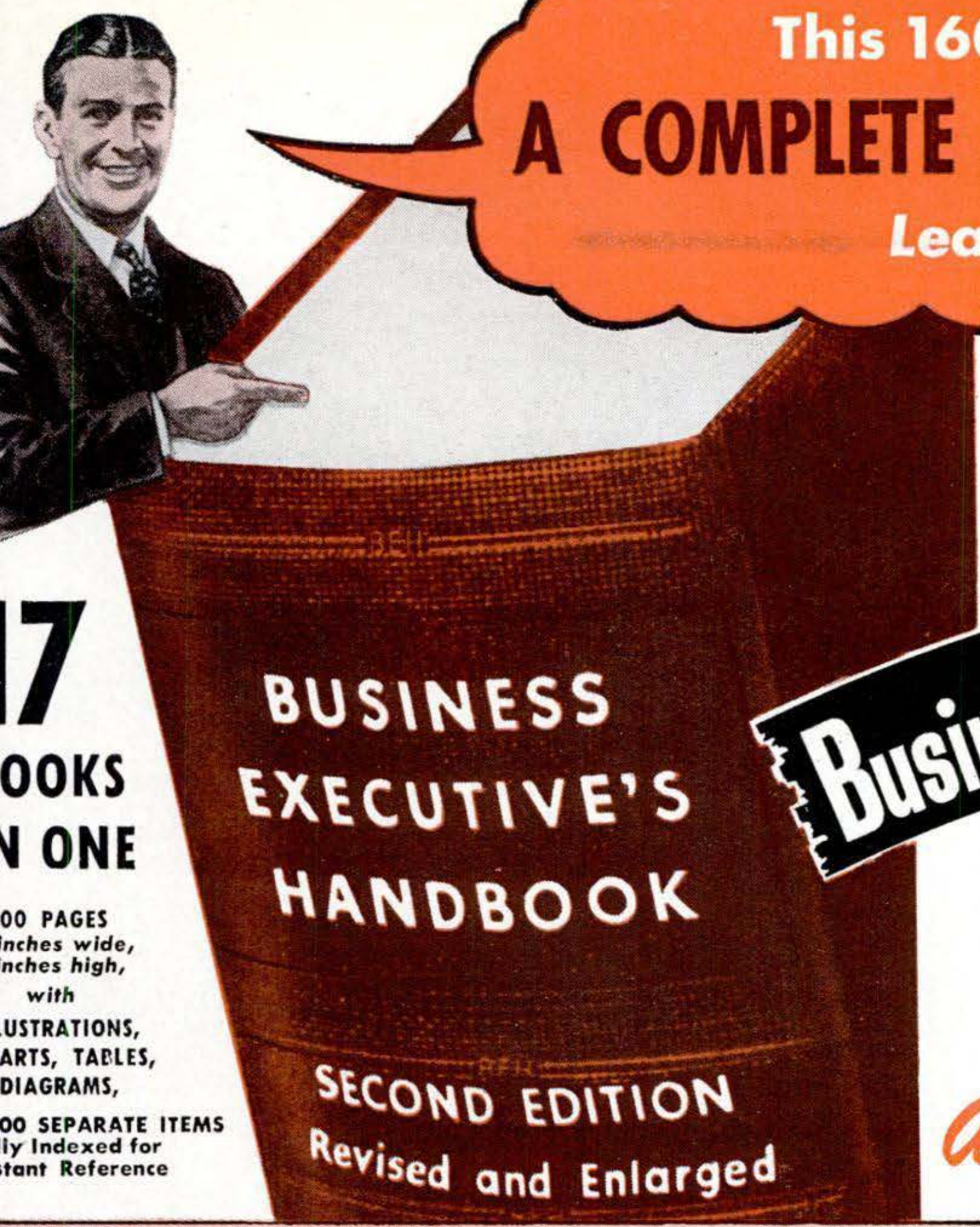
BUILDING BETTER LATHES SINCE 1906 • 456 E. MADISON ST., SOUTH BEND 22, IND.

Copyrighted material

This 1600-page Master V

A COMPLETE COURSE in BUS

Learn in Spare Time –



You can get ahead faster in busine
duties and larger earnings — if
handle executive responsibilities. Th
TIVE'S HANDBOOK gives you cl
how to prepare yourself for busi

THE PRENTICE-HA
Business Executives H

This s
makes available to yo
wealth of business informatio
immediately in whatever work you do
arranged that you can (1) look up an
the mere flip of a finger, and (2) study
business from its fundamentals to its

7700 USEFUL FACTS TO HELP YOU

Advance Yourself i

17 BOOKS IN ONE

00 PAGES
inches wide,
inches high,
with
LUSTRATIONS, ARTS, TABLES, DIAGRAMS,

00 SEPARATE ITEMS
ly Indexed for stant Reference

ere is just a small fraction of the thousands of items on which the BUSINESS EXECU-VE'S HANDBOOK gives you practical, time-saving, money-making help and guidance

THE DOLLARS AND CENTS OF BUSINESS: Short cuts in business mathematics show how to alculate simple and compound interest; bank iscount; savings through cash discount; trade iscounts; averages; markup and selling price; nnuities; sinking funds and amortization; depreiation; freight rates; verifying by check numbers; ables of weights, measures and values.

VRITE BETTER LETTERS: This section covers: plan to improve letters; compiling a correspon-ence manual; letter appraisal chart; tone and pirit of letter; how to answer inquiry; refuse re-uests; revive inactive accounts; build goodwill; nswer complaints; legal aspects of business letters.

HOW TO SELL BY DIRECT MAIL: Here is ex-ert guidance on: selecting lists; types of direct ail; self-question chart of direct advertising; esting direct mail; how to record results; how to uild mailing lists; how to write sales letters.

ELPFUL FACTS ABOUT ADVERTISING: acts for small advertisers; developing demand; ow to work with an advertising agency; fixing the advertising appropriation; selecting the right media; testing your advertising; how to design and register a trademark; copyrights; printing and typography.

MANAGING SALESMEN: Determining sales territories; sales quotas; recruiting and selecting salesmen; equipping, training and compensating salesmen.

SALES CONTRACTS AND FORMS: Essentials of a contract; when a sales contract must be in writing; forms of contracts for sale of merchandise; conditional sales contracts; lease agreement; miscellaneous clauses in sales contracts; contracts appointing agents; contracts employing salesmen; special provisions in salesmen's contracts; foreign trade definitions.

HINTS ON BUYING MERCHANDISE: Buying the right thing; how to standardize specifications; buying the right amount at the right place, at the right time, at the right price; procedure for handling and analyzing bids; requisitions and purchase orders; receiving and inspecting incoming goods; checking invoices; stores and inventory control.

HOW TO MANAGE AN OFFICE: Planning and maintaining the office for efficiency; equipment, files and appliances; making office procedure function smoothly; economies in the use and printing of forms; hiring and training new employees.

HOW TO CHECK CREDITS AND INCREASE COLLECTIONS: Sources of credit information; Dun & Bradstreet reports; special agency reports; credit interchange; salesmen, attorneys and banks as credit reporters; law relating to checks, notes, drafts or bills of exchange; how to write letters granting or refusing credit; how to write collection letters; collection reminders; form collection letters.

HOW TO DEAL WITH THOSE WHO OWE YOU MONEY: Collection of a claim by suit on the unpaid obligation; out-of-court agreements; assignment for benefit of creditors; equity receiverships; voluntary or involuntary petition in bankruptcy.

FINANCIAL STATEMENTS: The meaning of: current assets; fixed assets or fixed capital; tangible fixed assets; investments; deferred charges; current liabilities; fixed liabilities; contingent liabilities; reserves; capital stock; surplus.

BUSINESS INSURANCE: How to reduce cost of ample insurance protection; law governing insurance policies; types of policies; fire, burglary, theft, robbery insurance; fidelity and surety bonds; credit insurance; miscellaneous coverages.

DIRECTORS, OFFICERS, STOCKHOLDERS: Law relating to directors; removal of director with or without cause; liability of director for acts beyond corporate powers; law relating to officers; liability of an officer for mismanagement; rights, liabilities of stockholders.

CORPORATE MEETINGS, MINUTES AND RESOLUTIONS: Preparations for meetings; stockholders' meetings; directors' meetings and committee meetings; etc., etc.

PARTNERSHIPS: What a partnership agreement should contain; division of profits and losses among partners; liability of a secret partner; power of a partner to borrow money, collect debts, employ assistants, purchase and sell, etc., etc.

TYPES OF BUSINESS ORGANIZATIONS: Choosing a form of organization for a business; raising of additional capital; power to do business in any state; choosing a name, etc., etc.

FREE!
GIFT AND 10 DAY TRIAL

PRENTICE-HALL . . . a guarantee of RELIABILITY for over 33 Years

Ask ANY accountant, lawyer, banker or top corporation official about PRENTICE-HALL. He will tell you that PRENTICE-HALL ranks among the foremost publishers of the entire world, in the field of business.

More than 17 million students in high schools, colleges and universities have secured their training with the help of PRENTICE-HALL textbooks.

Now, in the Prentice-Hall BUSINESS EXECUTIVE'S HANDBOOK this world-renowned organization brings you condensed authoritative guidance on business matters of every description —with the assurance that every item in this Handbook is thoroughly reliable, accurate and in accordance with the most modern accepted business practices.

MAIL THIS CARD NOW

Experience is the best teacher!

HOCKEY STAR

CAL GARDNER

says –

Experience? *New York Ranger Cal Gardner has 15 years of hockey behind him, including two years with the junior champions of the world.*

Let your "T-Zone" tell you why...

More people are smoking CAMELS than ever before!

R. J. Reynolds Tobacco Co.
Winston-Salem, N. C.

● You'll read about it . . . hear about it . . . you'll see it for yourself—In sports, in business, in homes all over America, smoker after smoker who has tried and compared different brands during the wartime cigarette shortage has found Camels the "choice of experience"!

Why? Hockey Star Cal Gardner says, "Of all the brands I tried, Camels suit my 'T-Zone' best!" And that's where *you'll* find the answer—in *your* "T-Zone."

According to a Nationwide survey:

MORE DOCTORS SMOKE CAMELS THAN ANY OTHER CIGARETTE

When 113,597 doctors were asked by three independent research organizations to name the cigarette they smoked, more doctors named Camel than any other brand!

Copyrighted material